PICATINNY ARSENAL
TECHNICAL REPORT NO. 2510

# DICTIONARY OF EXPLOSIVES, AMMUNITION AND WEAPONS

(GERMAN SECTION)

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DOVER, NEW JERSEY

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## GERMAN EXPLOSIVES. PROPELLANTS, AMMUNITION AND RELATED ITEMS

le both WVI and WVII the Germans suffered great shortages of TMT, NG ere and had to resort to substitute explosives (called Eranappengatoffe) which is many cases safe inferior and more expansive than those used by the (Ilies, The same may be said about the propellants. The development of German military explosive and pro-pellents may be subdivided into the following:

A. Paried Before WWI. Black powder was used as a propelfant and he sa explosive up to the eighties when it was replaced for a short period by tends predemind (inally in the direction by implement propellant in avented by Datensholms A hingh-base tubular propellant was undepend in 1879, maker the name of \$2597 (Riberspilers 187) and a double-base tubular propellage (Nitroglyceriapatver) called RP'07 was adopted in 1907, la addition to those the German made a flate proceillant (Blattchonpaleet) and a disk- or cube propellant (Nurfelpulver). As a filler for projectiles the black owder was replaced in 1886 for a short period by sicric sold (PA ) and then in 1902 by THY.

or Period of WWI, Doe to the shortest of MG the German were forced-either to use slagh-hane propallaces or to trobsticute the NG-In double-base propalitants by some other HE, such as TNT or DNT, During the leaver part of WW L ween a shorage of cotton developed due to the Allied blochade, the German resurted to the use of wood pulp in the form of stude paper for afration to MC and nice to the use of compositious not containing new NC or NG Cles Ammenpulver)

As high-explosives for filling projection the Germans used in addition to TNT DNR TNAme and missures of these with Ani nitrate: In the later part of the war, when these aromatic nitrocomounds became scarce, they began union HNDPha, TNX, HNDPh, TNN, HNDPh salfide and their mixtures with Am nicrose. Ph nicrose and K chimese, Commercial blasting explosives; such as Denneis and Westphulit, and other more pensitive explosives were used for projectiles which were subjected to little or no netherit, such as trench morter shalls, greander and bombs. The Germans also sourced to incorporate Al powder is anderwater explaining All of these substituted were sairly powerful and america to the mixtures which they were forced to use during the laser part

C. Period Bolors WWII. Beginning in the middle 1950's the Germous foresaw a war and the gan the development of explosives which goold be used to replace those mend by the nitration of archatic hydrocarbons (derived from con) tur), of which it was patent there would be a shortage. The most important of these applanives were Hexogen (Cyclonics as RDX) and Pentrit (Pentaerythritoitetranitrate or PETN). Both of these explesives were desired from alinhatic compounds of which so shortage was expected during a war. In addition, these exp serves were much more powerful than INT. P.A. or even triry!, but they were too bensitive to be used alone as buretis g charges in shells. This difficulty was overcome, however, thy conting the particles of these explosives with about 10% of Montan was applied in the molten condition. Such explusive mixtures could be safely presslòndes into reojeccibre, such as 20mm to 18 mb shelle co Steaded into boosters or various shell. These mixtures could not be case because the m p a of RDX and PETN are too

high to permit them to be melted with test grandure ateam. When it was desired to load shells by capting, the Germans mixed RDX or PETN with about equal parts of for-melting explosives such as DNB or TNT

In addition to these squaries explosives the Germans. began the development of some rather inferior explonives before WVII. These were called Ernatzeprengetoffe (qv) (Substitute explosives).

An to propellants, about 5 years before WIL the Garmans arrand to develop double-base propellants which contained DEGDN (In lieu of NG) with or without NGs. These were auperior to HG powders because being "cooler" they dunned much lone ecosion of the gue bessels. The development of these propellages was done under the direction of General Uro Gallwitz (See Provellants).

D. Poriod of WWII. At the beginning of the war the Gurmane did not experience a shorts se of aromatic nitrocompounds and were able to use the following explosives for loading saelle: TNT, DNB, PA, weyl, HRDPhA, some slone and others in admixture with other explorives. For under-mane explorives, the German incorporated about 15% of pendered Al is the high explosives, as had already been door by them in WV | (See also under Aluminianed Explosives. main Al.

Of the explosives mentioned above, all except DNB may be considered at good military explosives. DNB in not as good because it is less perserful sad more toxic then THT. it was need, however, to smetch the supply of THE in ametal and manual-evers of explosive miscuses. The communicipals love as at DNB (ca 90") permitted its use with loading mintures cumulaing Am nicrose; Alarre. Such mintures did not exude aven at monical presentants."

As sentland shore; the Germans before WVII. derelegad two of the most powerful explosives, RDX and PETN. Thee these explosions burning southable on as Industrial scale they seared to replace the armeric sitrocomposide as berreing charges for various projectifes, as boosters and se best charges for detenators. This Al powder was incorporated in mixtures of ADX and PETN with other substances the resulting explosives were the most powerful and briance underwater deployives. It was by the use of these that the Germone mask many American and British ships.

The enersions demand for explosives and the shortage of raw meterials created a signation, about 1943, which made it necessary to use aubstitues inferior to TNT, thus lowering the efficiency of their amounttion. These mixtures are listed, and some of them described, under Ernstaurenestoffe

The Germans used single-base propellages in small arms and is some smaller guns, while double-best propelleurs is which part or all the NG was replaced by DEGDN for accestimes TEGDN), with or without NGO, were used in 37 mm of larger caliber cannont Arpropellant of rabular evanulation was used for guns, while either flake or disk type was used in howsters See Propellants ! .

Following are some figures for the monthly production. in metric tons of the principal high explosives for the years 1943 and 1944:

Explosiven	As of June 1943 (Produced)	As of June 1944 (Scheduled)
INT	16,600	21,000
PA .	280	400
DNB	1,380	.5,000
Tetryl	16	30
HNDPLA	650	950 -
RDE	2,470	7,000
PETN	820	1,409

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2) R. Euchles. Ammonathortersprengeraffe, Veit & Co. . Laipaig (1909)

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49) Micationy Assenal Technical Reports by A. B. Schilling and others are lieved under Ammunition. The state of the s

Total 14 S. Miscellaneous Reports (Nimbers) 33 and 32, 330 GOS (Combined Intelligence Objectives and Committed Intelligence Objectives and Science Intelligence Objectives and Intelligence Objectives and Intelligence Objectives and Intelligence Objectives and Intelligence Intelligenc

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(e) Physics commands actions from
(e) Dr L. B. Linitson, Nuchaington D. C.
(h) Dr A. B. Merthacter, Edited, Solometical

& Wm. M. Rinksshach, Allegeres, Pennsylv e) G. B. leisest and E. F. Kamel, Monorin of

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Abbreviations ber Ordenson Terms
Annican and British abbreviations are given under for dividual stress, whereas German abbreviations are ne-arabled to a spenmer section of the not of this divisions;

The numbers wish to make greated at two wisdom mean. In the general sensitiance given by a member of people of the general sensitiance given by a member of people of the general sensitiance, few jets of mal Alageboar of the following gauges of Pictatina Annual: Foreign the following gauges of Pictatina Character Societies, Tychairal Pittatina Character (Office, Picta Shap, Phomospher Gelich and Strongenschie Units and Unit

ow meet, in the reasonance. The nathers also wish the schoolwadge their appreciation to Dr Heas Valter, how at Pleasinay Assense and with the Gennan Vennanch during Will, for reviewing the measurable the furnithing some last minute additional information.

Doe to the showings of funds for this decisionary, except offset wan made to know the typing and printing cours on low as possible. For this peanon the lower cost vaccipying (outside country) was used instead of the hence but more superacree lineary ing.

Allied Expeditionary Force

Barnett, Explosives, Van Hostmod, N Y (1919) Beltich beelligence Objectives Sab-Come

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District of Calentin Describes Reichs Passer(German Passer) DRP Field Intellipence Agracy, Technical FLAT

Ger Great Brimin HARD His Majorey's Semigrary Office

Marchall, Espisaives, Churchill, London, v1 & 2 (1917), v3 (1917) Hary land

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Zeinscheift für das gevonen Schlener und Sperag-stoffversien Technical Manual and (Garfer "neil")

This complision has been made with the abject of providing a subject because to the analysts manual forward and providing a subject because to the analysts manual forward unity additional inspainful for understanding of the practiples, emaning of testin, process, packaged algorate etc. Removement of testins, process, packaged layout etc. Removement of the providing analysis of the providing and the provid

which is general, constrained where this could be done with was tomong may difficulty to the tender. However, a period was tomong may difficulty to the tender. However, a period was meet as the sud of each dictionary item to indicate the conclusion of the item. versus not of the item. Some item many innertions were made by Dr Federoff and not edited. For femiry processing, past Raglish, or inregular arrangements, be assument the spacehility and beyon that the some of the test is close everywhere.

It is hoped that the Genisral and Analytical sections of this project, "A Dictionary of Espisielves, Association and Wampens", will be liestyped and present a better appearance that was possible in dark

# NOTE

The General and Analytical Sections referred to in the body of this Section have not yet been published. It is expected that preparation of the General and Analytical Sections will be started early in 1988 with a publication target date sometime in 1960. Data under each letter of the alphabet will constitute a separate report.

The General Section will cover American and British explosives. erdance terms and a short resume of American and British assument tion and weapons.

The Foreign Section will include explosives, amountains and wear. one of countries other than US and British, i.e. German (this section). French, Italian, Japanese, Belgian, Czech, Spanish, Swedish, Swim, and Russian. Only the Russian Section has been published to date as Pleating Areenal Technical Report No. 2145, February 1966. The English Section is classified Confidential.

## LIST OF GERMAN EXPLOSIVES AMMUNITION AND RELATED ITEMS

"121" (Piring Composition), See Firing Composition 121, "A" (Rehotes), "A"/ Ruckets ) . Beginning about 1933, the Germins started to experiment with military rockets. The first model was the A-l which weighed about 330 lbs and was 57% long and 1 ft in diameter; it was unsuccessful. The pent rocios, the A-2, which appeared in 1934, was an improved A-I and when fired it reached as altitude of 6000 feet. In 1938, at Pecasumude, the A-3 was developed. This was the predeceasor of the A-4, developed in Ducambes 1942 and now commonly known as the V-2. The A-3 rocket weighed 1,650 the sid was 25 it long and 2% fe in diameter. The A-4 sector to new was at a sung sen 479 rt is enumerer. Law Art sector to bejerfy described under V-2- The next A recites that were depeloped at Poissemmedes the A-5, A-6, A-7, A-8, A-9 and A-10, were purely experimental. Among these, the A-9 and A-10 were insended for bombardment of the U.S.A. The A-2 was intended to be catried aloft by the A-1 during the first phase of the trass-Atlantic trip.

Reference: F. Ross Jr . Guided Missiles, Rections and Torpadess, Lethrop & Co., N Y (1951), pp 22-34.

### A-6 (Reches).Same ha V-2 (Reches).

[ See also W.Domberger, V-2, Viking, N Y (1954) ].

"Ad" | Functionals were low sension functionals developed at Troindarf Fabrik as substitutes for the "G 3" feecheads afte became difficult to obtain corium - magnesium alloy (called Mischments), use of the execution impredients of G 5.

The A6 funcheads were manufed by dipping the tip of a bridge wise successively into the following compositions: a) First sip composition consisted of dry Pb picture 90g and villicon (particle size 20 to 40 microse) 10g, puspossed in about 75 ml of a 25 sole of MC in any ) or

butyl acresse. After the coming was dry, the bend on the tridge wise was dipped hap the b) Second dip composition which consisted of day Pb

picross 50g, Pb chromoss 35g and nilicon (nine 20 to 40 micross) 15g, suspended in about 75 ml of 3% sols of NC is savi. or beryl accesse. The dried bend was disped

c) Third dip composition which was a incour commissing of a 15% sole of NC in 75/25 - buryl accesss/alcohol. to which was added 20% Sipalis AOM (methyl-cyclohexyl coars of adipic acid) calculated on the dry weight of the NC. Then the dried bend was dipped into the

d) Fourth dis composition which consissed of MC lacour ne in (c) to which was selded 0:8g of Sudan Brown (0.8g per 10 i of lacquer).

Further operations are the same no described under Functional Manufacture. Reference: R. Anberet or al. BIOS Final Rose No 285.

hem No 2 (1946), p A- 3/35.

A-8/A-10. Long mage guided missile designed to have a rouge of 5,000 km in heiefly described in TM 9-1985-2 (1953), p 233. Abbreviations for Ordnesses Tesms, See Ordnesses Terms and

Abbreviations in this section.

Abfell river or Abgengesium . See Wasse (or Secut) Acide. Abenechit 2.5mm az Filler No 57

Meseverfahren auf Grund des Krakstonel. A. Schmidt devel-

oped a method which permitted calculation of the mechanic work produced by the detonation of an explosive. It is deacribed briefly by A. Steetbacher, Spreng-and Schiesetoffe, Zürich (1948), p 116.

Assertes (Assertance). See present rection and the following references:
1) W.Reppe, Advances in Acetyleus Chemistry, PB Reps
1312 (about 1946)

1112 (about 1946)

2) W.Reppe, Synthesis of Intermediates for Polyamides or Acceylese Basis, PB Rept 23,553 (about 1946).

Active Shooth (Aktive Musci-purrose)-A type of shooth con-mining MG or NGc (nirroglycol) together with inert ingredients was used by the Germans for some permissible explosives, such as Vetter-Wassgit, etc. One of the earlier active sheaths consisted of NG 15, such salt 35 and Na bicarbona to 30% but this was later changed to NG (with or without nitroglycol) 17, rock salt 33 and his bicarbonage 55%. The composition of some other active sheaths were:

Sheath			N=CI	Na bicarbonase	Kieselgule			
M <sub>1</sub>			35.0 53.0					
M.	12.0		68.0	20.0				
MA	11.0	1.0	87.0		1.0			
M <sub>s</sub>	10.0		88.0		2.0			

The sheathing operation was carried out out the Sythest plane of WASA-G, on a modified Rispansan curridging machine, permitting caterings weighing 70 genus to be shouthed with "35 genus of active sheuthing meterial. Hose: According to Scottbacher (Ref 3) a shouth (Mantelparrose) 25 mm in dispareer and 3.5 mm thick, consisting of No bicarbonnes 82 4 85 with NG 18 - 13%, reduces the sempermuse of the groun of detonation from 2000 for in sentential explosive) to 400 C.

News: According to T.Urbeheki, Pracenys! Chemiczney 4, 487, (1948), the active layer (sheeth) was nade in the form of a nabe slightly larger than the carridge of the regular charge. The carridge was then inserted into the tube. When the catridge was exploded, the combastible protective when the carriage was explored, the comounter protective layer (sheath) was dispersed and vaporised, the forming a "cloud of salt" which prevented the spation of firedamp or coal dust which night be exceed by the cherge slows.

(See also "Sheathed Explosives" to the seneral section).

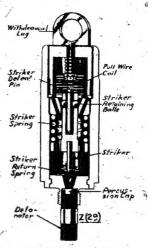
1) O. V. Stickland, PB Rest No 925 (1965) 2) R. Ashcroft, PB Rope No 63,877 (1946), pp A-1/8 and A-1/11 .

3) A. Seenthacher, Spreng- and Schierocoffe, Zwick (1948),

Aorial Burst Funos are devices designed to function a bomb while will in flight. Following Garmon funos are briefly described in TM 9-1985-2 (1953), pp 132, 168, 171

1) (41) Mechanical Clockweck Fuse was used in SD 2A Butterfly bemb (pp 132-5) 2) (29) Mechanical Asrial Burst Fuse, used in the LC 10f 2) (29) Mechanical Assial Burst Fano, used in the Lu Juvanial manife unit purschuse Hart, consissed of a bakalite heusing containing a closing cap, withdrawal, legacity spring, strikes puller gasdes, sumker peliger, switch containing a color spring, two ball decreases, and a juriler return spring. The withdrawal log and die system access upon, thing spenas, two data occasion, and solices recurs opining. The vithdrawal lag and the viscing cap were retained by a cond which was attached to the flare desconded the value, of the condition of the condit aufficiently to withdraw the ascriber desart pia. The ball densets were then, free to nove immed, and the surface peller was becede by the firing, spring to carry thinks, the series peller compressed the artiker return spring. The flash from the cap ignited the delay element (and), direc the delay, the decounter included the units

and, after the delay, the decounter initiated the main



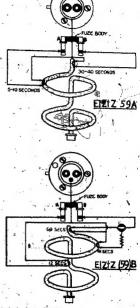
3) Pyrotechnic Aerial Burst Fuzes (49)All and (49)Bil mere med in some rocker bombs, each as PC 500RS and PC 1000RS (p 169)

500Bs and PC. (1000BS (p. 169)
4) (39) Mechanical Aeriaj Butes Fuze was used in parachase flares and photoflash bombe (pp. 171-27)
170 (pp. 171-171)
170 (pp fired as soon as the bomb or flare left the aircraft, initiating pyrosechnic delay trains which provided the aetial burst functioning. The shorter delay was fired from the A plunger and the longer delay from the B planger. If both plungers were charged, the short delay mactioned and if only B was charged, the longer delay from functioned. The inner construction of both fures was the same, but the (39)A was twice as long as the 59A (p 172)

398 (p. 172)

5) (59) Electric Aerial Burnt Fuze (El Zv.Z.) used in SC 350 bomb and in some parachute flaren, differed from the previous fuze by having three igniums instead of the conventional two. The igniter under the A plunger. was in such a position, as to give a 12-second delay. wan in such a position, as to give a le-second delay. The other, two igniters were under the 8 plunger and gave 41 and 58 second, delays respectively. If the subset delay wan, required, both plungers were charged, if a longer delay was necessary, only the B plunger was charged (pp 172-3)

71 69Cll. 69D and 69E Electrical Actual Baret Funca (Pyrotechnic Delay, used in various bombs and con-tainers, were cylindrical in shape and made of significanthe release from the place, the igniter bridge fired igniting the loose black powder. This is turn ignited the preparchaic delease interests. the pyrotechnic delay mixture (no composition wan given). On expitation of busing of the delay, the flash cosposition and the black powder pellet were



ignised, esc (pp 174-5) Ignatese, etc. (pp 174-5)

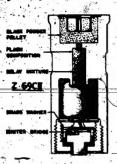
8) 79, (79) and (79)A Electrical Aerial Burnt Fuxes
(Pyrotechnic Delay) used in parachute flares and
photoflash homba, resembled in appearance and ection
the 59 (uses (pp. 174-5)

9) (89), (89)E. (89)E. "and (89)D Clockwork Aerial Burst

Fuxes are described on pp 175-7
The following serial burst fuxes are described in TM E9-1983 (1942), File Nos: 2314.9, 2324.91.

2324.92, 2324.93, 2342.95 (59) Mechanical Aerial Burnt Fuzz (9) Electrical Aerial Burst Fuze (See below) (49) Aerial Burst (Special) Fuses (59)A Electrical Aerial Burst Short Time Fuse

(89) Clockwork Aerial Burnt Short Time Fuze, One 10) (9) and (9)\* Electrical Arrial Burst (Short Time) Fuses, used in some parachute flares and in BIC 50 photoffinsh bomb, were cylindrical in abupe and contained a glow discharge rube, two condenters, a renistance, a similar charge was built





EIZIZE

hands 2. Ohe of the pro-WWI Synamises: NG 30.0, ver jelly 2.0, wood meal 1.0, Am nierom 36.0, K chlerido 31.06, envers balence + 5.0%, Trausi test 225 cc | Nacam. Nitroalyeerin (1928), p 411-].

Abardio . (Acardios, or naya-Diphenylaren). Described in the separal section. Acardiar was used by the Germans in some cholese propriitures. Then used in small quantities (say (1.6%) ie wan an a stabiliper, while in larger quantities fo g 25), is was used us a moderator of the burning race and an a flash reducer.

Nose: According to PB Rege No 11,344, neither an anym aus a sym DPhU exercises any gularinizing serion on MC. enpecially if NC is of high sisrogen resear.

During WVII, the Germans called says DPhU Absolt 1, because they developed two other derivatives of since Absolt IR (H C)HN.CO.N(C H.), and Ahardir III, (H C MN.CO.M (C H.), As a stabilizer, Ahardir II was bourer than Ahardir III, and the lesser was better than Ahardir I.For pelazinization of MC Abardie III was become then Akardie II, and II was become then | See PS Rept No 925 (1945) p 18 .

Albert See Georgian Albin.

Aldarlio (Aldarlios). A Pavine-type explosive invisand in Suizzecland and also used in Germany. For example: Am issue \$1, THT 17 and type floor 25; velocity of decemption -4960 m/sec-ec-4-1,17 for charges confland in 50 mm diameter mini tubes.

1) Marshall, 1(1917), 391 2) Bameri(1919),p195 (See also under Swine Exploilves).

Allahutia Hitramiano of WW H. Out of a prost made 

155° and (O\_NO)CH\_HONO\_XCH\_NONO\_XCH\_HONO\_XCH\_N (MO\_)CH\_(ONO\_), mp 2110, are of percirular in came they seem to be more powerful than RDX, infant by the Trausi lead block test. Both situations were ob-

tained as by-produces in the manufacture of RDE ming either the E-fain or the EA-fain process. [ G. Elimas. PRL Rept No 85,140 (1946); p 16 ] .

Nour According to Mr L. Milbiman of Picasiany Account, the above compounds are called: 1.7- Dinitarity - 2, 4, 6 - triains - 2, 4, 6 - triains hepsman and 1.9 - Dinitarity - 2, 4, 6, 8 - sectorium - 2; 4, 6, 8 -

The description of these composeds in given in the

Alkalait (Alcalaise). A type of Electing explosive becod on prochloroses, such as Albertain It K chlorose 28, Am nimen 25, K or No siesses 36, sissebudy (such no TNT) 11.5; wood or careal ment 2.5, resin (such as colombary) 2.5, and bridgecarbon 0.1%).

1) F. Ullman, Ensyklopidie der sechnischen Chemie, Urben & Schwarzenberg, Burlin, v 4 (1929), p 780; 2) A. Pforn-Ace. Trussio de Explosivos, Cultural, La Habana (Caba) (1965) p 218.

ley Steels, especially high compensure alloys, such Biblier alloy, Counsiler, Reneate, Stevenst S, Thompsele d Tennez are described in CIOS Roys, File No. 25-23 (1946)

on (Alusium) is described in the general section, erann electrolytic method of manufacture of Al guite in described in CIOS Royc File No 23-4 (1946)

Aluminium Employees (Aluminiumhaltice Spreagatoffe). The use of Al explosives was begun about 1900 (in Augtria) and such explosives were known as Ammonals. One such explonive was tested in France in 1902 by the Commission des Substances Explosivés. According to Lheure it contained; Al 25. Am nitrate 71, chercoal 4%. Another aluminized explonive, called Führer, contained: At 14, Am hitrare 83 and chercost 3%.

The role of Al in explosives was not very clear until secretly when it was explained by A.Stettbacher of Switzerland (Ref 1) and H. Shiraolic of France (Ref 2). After it was found thus Al in particularly effective when used in underwater explosives, the Germans replaced their underwater explosive of WW I: TMT 60.HNDPhA(bexanitrodiphenylamine 40 by the following mixture: TNT 55.7, HNDPhA 27.9 and Al grit (40-70 mesh) 16.47. The same idea was followed in Sweden, where Al was used in their Bonix and Novit explosives. Great Britain and the USA sinc included Al in underwater explosives; such as Torney and Tritonal (British UVE). The Italians and Japanese also used Al explosives. According to Stettbacher, another German underwater explosive contained: TNT 61.8, HNDPh A 230.

Among German sliminized explosives developed below or during WI II may be cited: S-6, S-6 modif, S-19, S-22, S-26. E-4. EMA and S-16. Their compositions are given under Ersauagrengatatie (See also Anagon, Berclavie B, and Nitrobaconit).

(For more information see Aluminized Explosives in the erectal section).

References:

1) A. Seerchacher, Procur 9, 33-45 (4943) 2) H; Marnour, ibid, 62-63 (1945)

5) L. Middard, Mem Art Fr 22, 595-01 (1948) Aluminined

4) A. Stretbucher, Spring- and Schigsproffe, Raucher, Zürich (1968), p 86-90.

Aleminum-Chlommethyl Misture. See Hethyl Stoff.

Aluminum Mine See under Landminen and ulso on p.273 of TM 9-1965-2 (1953).

Annel (Fillpulver, abbreviated Fp) (Amazol). The composition of most anatols was TNT and ammonium aitrate, but the designation was the reverse of the American amatule. For instance, German 40-60 Amatol of Fp. 40-60, corresponded se the American 60/40 Amerol (Am aitrate 60, TNT 40), (See also Filler No 13, - No 14a and - No 88).

There were also German ametals which commined no That but some other explosive or explosives. These amazole Old 39, 40 and 41) are described below.

Amount 39- A mixture developed by Romer (Ref 2) as a burnting charge for the V-I tockets, it contained DNB 50. Am nitrate 35, 3DX 15, and was claimed to be an powerful as Fp 60/40 (TNT 60, Am netzare 40). Due to the testicity of DNB, londing of the projectiles was ventillation. As it was difficult to cast-load Amazol 39 uniformly (without formation of cavities) in large caliber projectiles, G. Romer (Ref 3) used the so-called "Biscuit" loading method, in this method, a projectile was filled alternately with pieces (pellets) of so-called bincuit mixture A" (Am nitrate 30, rechnical Ca nitrate 25. PETN 10 and RDX 15%) and molten Amatol 39 at a semerature of about 80°. The resulting mixture formed no cavities on cooling. he dennity at room temperature was 1.58, velocity of detonation 5600 m/sec, Travet lead; block expansion test 350cc for a 10 g sample one a creater cost value (Staucherste) (construction of a lead block) 17.5 mm.

Notes: a) According to Ref 3. Amorol 39 was developed in 1939 at the Krijmmel Fabrik of Dynamit A-G and was used for filling projectiles.

b) One of the Amatols 49 was used in underwater explosive charges.

Amorel 40. This explosive was sometimes used during WW It for filling the war head of V-I Rockets, it contained DNAms 50, Am nitrate 35 and RDX 15%, it could be cast-loaded like TNT (Ref 3).

(Another composition, also known as Amerel 40, is given under Franzuprengaroffe ).

Amered 41. An explosive similar in composition to ammonites: Am nitrate 52, Ca nitrate (tech) 6. PH-Salz 30. RDX 10, months wax 2%; density of fragments 40 m (TNT 40 m): used in bombs (Ref 3),

Note: According to Ref 1, Kast, as early as 1985, proposedthe mixture of Am nitrate 40 and TNT 60% for cast-loading German projectiles. The same mixture was used later by the British under the name of 40/60 Amaiol, According to Urbanski (Ref 3) an Amarol of WW II contained TNP 50. RDX 5-10 and Am nitrate 45-40% by the DNB Dinitrobensens; Abbreviations: DNAms Dinitroanisofs: DNB Dinitroanisofs (PETN Pentserythrio) tetranitrate; RDX Cyclonite; TNT

Referencé as

1) A. Stetthacher, Schiese- and Sprengatoffe, Barth, Leipzig (1933), p 308 2) G. Römer, PBL Rept No 95,160 (1945), pp.17 & 23 3) O. V. Scickland et al, General Summary of Explosives

Plants, PB Rept No 925 (1945) 4) T.Urbanski, Przemysł Chemiczny 4, 487 (1948).

Amberit (Amberite). One of the sporting propellants: collodion cotton 59, guacotton 13, Be or K nitrate 19, paraffin 6.0, moisture 1.5, gelatinizer 1.5% [ Brunswig, Das rauchlose Pulver (1926), p 134 ].

Antiquiver (Anadpowder) was a sulfurless black powder substitute invented in 1885 by Gans of Hamburg, it had the tollowing composition: Am nitrate 38, K nitrate 40 and charcoal 22%, its composition was modified several times well a powder which was flashless and almost smokeless was obtained. The improved composition: Am nitrate 37, K nitrate 14 and charcoal 49%, was used during WVI as a cannon propellant. Rollingers:

1) Davis, (1945), p 49 2) Beble, (1945), sp 20-21,

Amountain taluminum bultige Sprengstoffe) are explosives based on Am Mittage, Sand TNT or other organic substanced. Ammonate have been used for many years, not only in Germany but in other countries, and for this reason are also described in the general section. Several ammonals were used in Germany for military purposes. They may be considered as substitute explosives (Ersainsprengatoffe), for

monel 4. Am nitrate 34, TNT 30 and Al flakes 165 Anmonal H. Am pitrate 72, TNT 12 and Al flakes 16% Amounted B. Am nitrace 93-93.5, charcoat 2-3 and At 2.5-

Annual Am nurse 91.3, TNT. 0.3, At 1.7 and pitch 6.75. This composition required a booster for initiation. (See also Fillers Nos 19, 13-113 and 110).

Relements: 1) Davis. (1943) p. 368 2) PB. Rept No. 7925, (1945) 3) PBL Rent 25 160 (1946) 4) A. Stettbacher, Spreng- und Schienstoffe Rescher, Zwrich (1948), p 88,

mention See Versey-Americanisis.

which may be considered intermediate between na' and amondism sitrate explosives.

antidam and proportion Table I gives the these explosives: "

Composition (%) and " some proportion	carbonit [ (Ref I)	Amaca- carbonit (Refs 183)	cathenit II (Nef2)
Annonamon, nitrote Putagainen nitrite Putagainen nitrite Putagainen nitrite Saddien nitrote Nitriugiyostin Callodien cutton Gyverin Carlodyaknion (nuth an onach, filour) Caol abost Alloli chioride Wedd monil	4.0.2 4.5 6.	82 10 3.8 0.2	36.4 7 3.0 3.0 4.0 22.6
Onygen Belonce Density Valority of Dessession	1.11	1.06 3380 m/sec	10%
Treasi Test	355 ec		210cc

 Murshall Tpan 397, 2, p 493 \_2) P. Naud m, Nigroglycotin (1928), p 434.
 Ellenna, Empthophilis, v.4 (1929), p 780 4) Davis, (1943), p 352.

Annale (Anna dynamics). A type of piralghe dynamics mentions a considerable amount of amountum nitrace. - Am microse 30.0, NG 63.0, reliadion certain 2.0, want ment 5.0%; onygen belance + 1,5%, denoisy 1,44, Transl sest value 485 cc, Ph block crushing 21.0 mm, velocity of deceasion 7000 m/sec, heat of explosion (water vapor) 1500 kcsl/kg, temperature of explosion 2770 C.

Thin, type of explosive was not very popular in Germany but was used in France and the USA [ P. Hoodin, Nitre alveerie (1928), p 349 1

monagelatine /(Amenigelatin). A type of permissible sensise, such gas: a). Amengelatine 2: DNT 7-8, Al 1.5-2.5, collection cores 0.5-0.7, distrocklorobydeis (DNCIH) 21-24 . Am nitrate 61-65 and carbohydraces, nor more than 1.5%. (Ref 1).

Now: The Am airrace may be replaced by Na airrace to the extent of 8.5% of the entire explosive and the DNCIN may be replaced by NG to the extent of 4% of the entire explosive. b) Ammengolatine As explosive permitted after W.l for use it Pransing pluings DNCIH (of which up to 5% of the total explanive may be replaced by NG) 28 to 32, collection comme 1 to 3, Am nitrace 45 to 50, alkali nitrace 10 is 15 a nirrocompound of telefone and/or naprhelens, had/or eliphenylamine 6 ap 12; warethir ment 0 to 25 Claf 3).

of NG (such a mixtus use celled Nitrochlorin) 30, collection cotton 3, mixture of DNF and TNF 10, Am sistere 45, Na nitrate 10, wood meal 2; density 1.45, velocity of detenses 6900 m/pec, Tranti test value 400 cc; wol of panes at NTP 771 1/kg, heat of ex-plosion 1101 kc/l/kg, temp of explosion 2570, specific personne \$105 are (Refs 2 and 4).

Abbrevieties: DMCIM Dinibrochlorohydris; NTP temperature (0° C) and pressure (760 mm).

(Compare with Ammon-Astralit): References:

1) A. Marshall, Explosives, v 3 (1932), p:109

2) P. Nagum, Schiens- und Sprengatolle (1927), p 113

3) F. Naou m. Nitroglycerin (1928), p 379

4) A. Seettbacher, Spreng- und Schienstoffe (1948), p 86.

Remonius (Ammonius) is described in the general section. The German method of manufacture of synthetic ammonius; described in BIOS Final Rep. 1447 (1946).

AMMONIT (Ammonite). A type of ammonium nitrate explosive which has been known for many years and which exists in many varieties. Most ammonites were used as commercial explosives, but some of them have found use in military agplications, chiefly as substitutes Care Treattappen stoffe) for explanives based on organic nicrocompounds, such as TNT's, or mitric enters (such as NG).

Many types of amountes were known in Germany before WWIL. For instance, Naou m (Ref. 1) describes seven types, Beyling and Drekopf (Ref. 3) four types and Scotthaches (See table 2 on soit page listing semesites used during Wi he military personne and one size many Com-

1) P.Naoum, Schiene- und Sprengnioffe, Steinkopf, Dreaden (1927), pp 119-121 2) A.Stetthacher, Schiese, and Sprengetoffe, Barth, Leipzig,

71953L's 246 3)- C. Boyling & K. Drekopf, Schienscolle und Zundmittel.

Springer, Beelin (1936), pp 94-95 4) O.W.Stickland et al , General Summer! of Explosives Pinats, PB Rept No 925 (1945), Appendix 7,/p 77

5) G.Romer, Report on Explosives, PBL Rept No 85,260 (1945),

medicine Hitrate. Sen'Ammonasibetes

Ammonium Hitrato Emplosivos, See Ammonsalpetersprengstolde.

Ammon-Hobelit (Ammon-Nobelite). A type of permissible explosive beed after WI, such as: a) Am nitrate 78.0. K nitrate 3.0, alkali chloride 8.0, meal 5.0, NG 4.0%; oxygen belance + 11.8%, Traux) test value, 200 cc. bit Am nitrate 61.0, No nitrate 3:0, men! 7.5, glycorin 3.0, nittotolucues 1.0, aftali chloride 20.5, NG 4.0%; oxygen befonce 0.0%, Traus! tene value 215 ce i Naoam, Nitroglyceria (1928), pp 434-5 ;

Ammongolver (Ammonpowder) A propellese first musufactured in 1890 in Austria by incorporating Am nitrage 35 with charcoal 15% and compressing the mixture into large pellers to a density of about 1.4. It was used during WE by the Abstrians and Germans as a substitute for NC propellant and ballintite and was claimed to be very effective and practically mokeless, flashless, and erosionless. On the other hard, was found to be difficult to ignite, gave rather irregular ballistics and had a readency to dinintegrate on atorage due to allotropic change in the fin nitrate at 32° (90°F). In order to minimize irregular ballistics, only 1/3 to 1/2 of the to minimize irregular parisasce, only all to all im-propelless charge consisted of Amonopulver, the reas Being NC propellant. In order to protect the Am silicate from an mospheric moisture the pellets were sometimes suclosed

in a box made of thin sheets of double-base prorellant (Ref i. Money According to Davis (Ref 3), Ammortalives contained a small amount of an aromatic nitror; supposed in addition to the above listed components.

The Ammonpulver described by Husbat (Ref 2) contain

				Desi	nution	of Amm	onites						
Components and	No 5	434	438	41c	43C	No ?	HI.	Н5	No 3	No ?	No ?	11-2	14-8
App pierace App pi	9.8 8.4 9.8 30.0	8.0 8.0 8.0 8.0 9.0	10.0 2.0 5.0 7.0 10.0 2.0 5.0 7.0	ider Erkattaprengatoffe	10.0 15.0 30.0 0.5	46.0	10,0	50.0 5.0 15.0 10.0 20.0	55.0 5.0 10.0 10.0 20.0	\$2.0 8.0 7.0 7.0	50.0 15.0 10.0 10.0	der Ersbizaprengereife	nder Ernetzuprengrtoffe
Density (cast) Casting Temperature Density of Fragments Mining Effect References	41 m 21 m <sup>3</sup> 5	1.58	1.61 105 38m	Ser un	4	39m		4	1.55 108 40m	1.50 112 41m		See un	7.500

The composition given by Römer (Ref. 5. p 22) totals [04

Approvir 43C exploded in 1944 on a loading line and its manufacture was discontinued. It was reported that mixtures of TNT with guanidine nitrate were unstable

Most of these mixtures were suitable for loading bombs, grenudes and shells.

Am nitrate 90 and chargost 10%. The mixture was comprehend in the form of perforated cylindrical pellers 4 to 50m long. and 3 to 4cm in diameter. The ignition temp of the compound was 160- 1650, but if substances like iron rust, ZaO or CuO were present the temp was lowered to 80 - 120

Note: According to CiOS 31-68, p 7, the composition of Ammospulver used during WV II was as follows: Am nitrate 50, NC (12%N), 22, DEGDN 22, bydrocellulose 5 and centrality 1% References

1) Mershall, 3 (1932), pp 88 -2) H. Herbet, Chem-Ztg 59, 744.5 (1935) 3) Davis (1943), a 49.

Ammonsulpator (Ammonium Nitrate) is described in the general section, its manufacture in Germany at Bitrisfeld South and Wolfen plants is described in BIOS Final Rept No 889 (1946).

menselperersprengsselfe (AS) ader Sicherheitssprengsselfe See Ammonium Nitrate Explosives, in the general section, The German References on this subject include:

1) R. Escales, Ammonsalperersprengatoffe, Veit, Leipzig

2) F. Naoum, Schiene- und Sprengeroffe, Steinkopf, Dreuden (1927), pp 114 3) P. Naos m, Nirroglyceria etc., Villiams & Wilkins, Bal-

more (1928), p 423, 4) A. Sternbacher, Schiens- und Sprengatoffe, Barth, Leipzig

(1933) p 295 5) C. Beyling & K. Drekopf, Sprengstoffe und Zundmittel Springer, Berlin (1936), pp 93-96 6) A. Stettbacher, Spreng- und Schiennutoffe, Raucher, Zieich

(1948) pp 86-88. AMMUNITION (Munition), See under Dombs, Bullets, Cattridges Fuxes, Grenades, Mines, Projectiles, Rockets and also in the

following references: 1) Johnson, Jr and C.T. Haven, Ammunition, W. Morrow, N Y

2) Dept of the Army Tech Manuals, TM 9-1 :65-2 and TM 9-

1985-3 (19 35 G.M. Ta Dicationy Areenal Technical Report 302 (1939) (20 7 ipmetail CRA)

4) W.H. Ewart, Ibid, 1053 (1940) (20 hm Solothura CRA)\* 5) A.B. Schilling, shid, 1168 (1942) (105 mm How CRA) 6), A.B. Schilling, ibid, 1228 (1943) (88 mm APC MOCRA)
7) A.B. Schilling ibid, 1238 (1943) (50 mm APRESC CRA) 8) S.M. Dennis, ibid, 1242 (1943), (20 mm APHY CRA) 9) R.M. Dennis, Ibid, 1243 (1943) (47 mm APC CRA).

10) A. B. Schilling, thid .1245: (1943) (47 mm APHY CRA 11) A.B. Schilling, ibid, 1247 (1943) (75 mm APC HE CRA 12) R.M. Dennis, Ibid, 1248 (1943) (20 mm Inc. CRA)

13) A.B. Schilling; Sbid, \$250 (1943) (50mm APHV Nk-ECRA) 14) R.M.Dennis, ibid, 1253 (1945) (37 mm APHE CRA) 15) A.B.Schilling, thid, 1256 (1943) (20 mm IJE SD CRA) 16) A.B.Schilling, ibid, 1259 (1943) (47 mm HE CRA) 17) A.B.Schilling, ibid, 1263 (1943) (80 mm Sm CRA for Mor)

18) A.B.Schilling, ibid, 1267 (1943) (50 mm APHV SC CRA) 19) A.B.Schilling, ibid, 1270 (1944) (50 mm HE CRA for Mar). 20) R.M.Dennis, ibid. 1271 (1943) (57 mm APHV MD CRA) 21) R.M.Dennis, ibid, 1272 (1943) (47 mm AP MB CRA) 22) R.M.Definia, ibid, 1273 (1945) (50 mm APHE MB CRA).

23) R.M.Dennis, ibid, 1274 (1943) (50 mm APCHE LC CRA)
24) A.B.Schilling, ibid, 1275 (1943) (20 mm AP Inter Loaded CRAI

25) R.M.Dennis, ibid. 1276 (1943) (75 mm HE CRA) 26) A.B.Schilling, ibid, 1300 (1443) (88 mm HE CRA) 27) R.M.Dennia, ibid. 1305 (1943) (50 mm HE SC CRA) 28) R.M.Dennis, ibid. 1314 (1943) (37 mm HE CRA)

29) R.M.Dennis, thid, 1318 (1944) (50 mm HE LC CRA) 30) R.M.Dennis, ibid, 1320 (1943) (3.7 mm APHE NB CRA) 31) R.M.Dennis, ibid. 4326 (1944) (42/28 mm APHV CRA)

32) A.H.Schilling, 18id, 1329 (1914) (28/20 mm APHV CRA of two designs, single-piece body and two-piece body) 33) A.B.Schilling, ibid, 1334 (1943) (75 mm Chem CRA)

34) R.M.Dennis, ibid. 1340 (1944) (80 mm HE CRA for Mor) 35) R.M.Dennis, ibid, 1343 '11944) 175 mm HE CRA for Pak 40 gun)

- 36) A.B.Schilling, ibid, 1390/(1944) (28/20 mm HEHV CRA) 57) A.B.Schilling, ibid, 1591 (1944) (88 mm HE LC CRA for Flak 41 gun) 38) A.B.Schilling, ibid, 1392 (1944) (88 mm APC LC CRA

for Flak 41 gue) 39) A.B.Schilling ibid, 1398 (1944) (37 mm HE HoC CRA) 40) A.B.Schilling, ibid, 1421 (1944) (75 in APC HE CRA) 41) J.P. Vardlew, ibid, 1422 (1944) (80 mm HE CRA for Mor) (Bounding type shell) 42) F.C. Haverlak, ibid, 1430 (1944) (20 am HE-T CRA for

Mauser gun) 43) A.B.Schilling, ibid, 1454 (1944) (75 mm HE HoC CRA

45) A.B.Schilling; 164, 1468 (1945) (50 - HE LC CRA) 46) F.G.Haverlak, ibid, 1478 (1944) (20 mm HE Inc CRA) 47) F.G.Haverlak, ibid, 1481 (1944) (105 mm HE HoC 50

CRA) 48) F G.Haverlok, ibid, 1487 (1944) (75 mm HE HoC CRA for recoilless gue) 49) A.B.Schilling, ibid, 1488 (1945) (150 mm HE Hat CRA) 50) 1.P. Vardlew, ibid, 1490 (1945) (75 am HE HoC CRA for

Dat 40 aum) ' 31) F.G.Haverink, ibid, 1496 (1945) (105 mm HE HoC Type C-) LO shell CRA)

52) F.G.Haverlak, ibid, 1503 (1945) (75 mm HE HoC CRA (or XwX40 gua) 53) F.G.Haverick, Ibid, 1508 (1945) (100 mm APC HE CRA) 54) F.G. Haverlak, ibid, 1516 (1945) (88 mm APC HE CRA

for KwK(3 and Pak aun) 55% A.B.Schilling, ibid, 1522 (1965) (150. mm HE CRA. separate loading)

36) A.B.Schilling, ibid, 1529 (1945) (150 ..... HE A/C CRA with BD (use)

57) F.C. Saverlak, ibid, 1540 (1945) 475 ma HE HoC CRA for short berrel rank gue, KwK 38)
58) F.G.Haverlak, ibid, 1551 (1945) (150 mm How CRA)

59) F.G.Haverlak, ibid, 1552 (1945) (210 mm HE CRA) 60) A.B.Schilling, ibid, 1559 (1945) (88 mm HE, servaced shell for Flak 18 gum)

61) F.G. Haverlak, ibid, 1575 (1945) (152 mm CP shell and carridge case with propellage of Russian origin)

62) A.B.Schilling, ibid, 1577 (1945) (240 mm HE shell with PD and BD funes; carridge case and propellmet)

63) A.B.Schilling, ibid, 1578 (1945) (75/55 mm HE CRA for

supered bore Pak 41 gun) 64) A.B.Schilling, ibid, 1579 (1945) (75/55 mm AP-CRA for tapered bere Pak 41 gun)

65) A.B.Schilling, ibid. 1582 (1945) (100 mm HE CRA for Mor) 66) A.B.Schilling, ibid, 1604 and 1605 (1946) (105 min rocket assisted HE shell?

67) A.B.Schilling, ibid, 1606 (1946) (128 mm rocket assisted HE shelly 68) A.B.Scailling, ibid, 1607, 1608 and 1609 (1946) (150 mm

rocket assisted HE shell) 69) A.B.Schilling, ibid, 1610 (1946) (150 mm rocket assisted

AP shell) 70) A.B.Schilling, ibid, 1903 (1954) GO mm HE and lac shell for the A/C Mk-108 cannor (Confidential)

71) Anon, Encay Sombs and Fuzes, Was Dept The E9-1983

(1942)
72) Asson, Enemy Var Materials Inventory List, Assumation, Supreme Headquarters AEF (1945)
73) Asson, Recognition Headbook of German Assumation, Supreme Headquarters AEF (1943).

Note: All Picationy Armenel reports except No 1903 are inclassified

Abbreviations AA Antinircraft; AC Aircraft; A/C Anticoncrete; AP Armor-piercias; A/P Anti-personnel; BD Basedetonating; C Capped; Chem Chemical; CP Concrete-piercing CRA Complete round of amounition; Floh. German designation of Antistirerate; HC High capacity; HE High emplosive; HoC Hollow (shaped) charge; How Howither; HV Hyper relacity; ine locundiary; KwK German designation of Tank Gun; LC Long case; LO Long ogive; MB Monoblock; Mar Morter; Pok German designation for Antiunk; PD Point-detonating; SC Short case; SD Self-destroying; Sm Smoke; SO Short ogive;

"Amerea" (Toy Pintol Cop). Due to the shortage of fulminate caps ducing WW II., the Germans used amoreus as ignitera for some hand grensdes. Amoreus amoufactured by Ferdianad tor some hand greanden. Amoreus manufactured by Ferdinand Vicket. Vapertal-Barmen and by Blumberg & Co., Linnof hei Düsseldorf contained: K chlomet 67.5 to 80.6, phocyaborus 12.3 to 8.0, saltur 8.9 to 3.7 and chalk 15.3 to 5.7.7.

Reference: BIOS Final Rept 1313 (1947), pp 2-4.

Annual Cac of the early aluminized explosives: Al 5.5. Am hitrare 84.5, K autrare 1.5, charcoal 8.0, Be nitrate 0.5% L. Medard, Mem Artil Fr 22, 596(1948)-L

Angenithm with (Angenis Capa). Due to the anomage of beans during WVI, the Germans used zinc and zincated iron cape. They were filled with TNT as the beer charge and compressed silver fulminate as the primary charge. The ensemble was called Assonithapsel. [ P. Naoum, Schieseund Sprengatoffe, Steinkepf, Dreeden (1927), p 185 ]. Anthoresett Wind Gun. See Wind Gun.

Antibonb-up Fuzo (Astirupture Fuzo), such as AZ (2004; was a mechanical impact base with a safety aming period of 10 seconds provided by the clockwork gest train. There were two striker systems incorporated: se isercia strike. wery two striker "systems incorporated: as isertial spitker-system to operate on impact and an antimptowt...giffer to 'haccion in case there was any distortion of bonk...or, flass-pocket on impact. The two profiles "systems, were located at opposite ends of the fast separated by a 'flash channel shout 260 ms long. This 'lates, as well as the AZ. (24), are described in TM 9-1985-2 (1953), pp. 135-9. They were used in banh SZ (2500 kg.

(See illustration on next page)

Antidiaturbance Fuza (Electrical) was a device designed to function if disturbed after the humb, dropped from a plane had come to rest. One type, the 50, consisted of a postulation towar constitutes as detected circuit (row con-densions, tow registers, a super-sensitive hall-rembles which and bridge wire of primer) and row charging plungers. The base of the cylindrical case was threaded to nevertous from the plane was conducted through the charging plungers into the charging condenses. During the flight the charge slowly leaked through a high control of the charging plungers into the charging condenses. During the flight the charge slowly leaked through a high control of the con-tinuated, the trembler which caused the circuit to be closed. This ignited the pointer, instanted the booster and demonated as fill charge of the book. This slay took places this case the current from the condense preparated the writch. TIM \$198-104-104. It is not 252. cylindrical case containing as electrical circuit (two con-

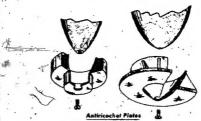
(1953), pp 183-6.

(See illustration on sent page).

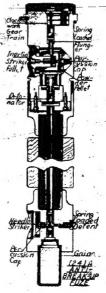
Antilifting Punifer, See items I and L meder Imiter Antipothilindar Devices. See Pysocechnic Antipathilinder Devices.

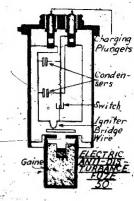
Antipodel Bomber. See Sanger-Breck Missile.

Apri-Ricacher Plates. Circular shaped metallic devices attached to the source of some aircraft hombs intended to prevent ricochet when striking at an angle of obliquity against very resistant targets (such a grace), or to prevent extensive penetration into less resistant targets (such as prace), or to prevent extensive penetration into less resistant targets (such as concrete or wood when authing them at an angle close to norwall. (See linearization on next page and also under Kopfring) [ TM 9-196-2 (1933), p 4 ].



SC 50





Antiwithdrawal Fuxes (Nechanical) were designed as protective devices to prevent withdrawal of regular time fuzes from bosobs. Three types of such fuses are described in TM 9-1985-2 (1953), pp 177 & 179-181: ZwaZ 40, Types 1, II and III. The type 2 fuze consisted of a cylindrical the gains of the time fuze which it brockered, and a second which was threaded into the base of a ZusZ 40. An attempt to withdraw the fuze would cause the steel ball (below the detent spring) to be displaced, thus allowing the artiker to hit the deconator. The resulting flash was transmitted drough a small channel to the booseer and the bomb was exploded. To prevent the withdrawal of the Zusz 40 when the time fuze was removed, spring-loaded thile adject were placed in the upper part of the device. (See illustration on next page).

"Annie Annie" or Loopeld 280 mm Railroad Gun, Model 5 (See under Venpous) Armored Care are described in the following referencest:

"Achtung Punzer", Great Oaks, RD 1, 1) G.B. Jarrett, "A Aberdeen, Md (1948) 2) D.F. von Senger u Erterlin, "Tauchenbuch der Panzer," Lehman, Minchen (1954) (See also under Panzer).

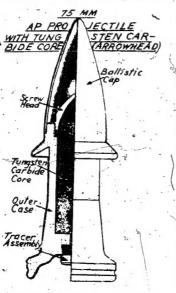
Arts (Azite), A mining explosive reported to be manufed by VEB Sprengstoffwerke, Gnaschwitz, Ita approximate compovition is NG, pyroxylin, sawdust, TNT and inorganic sales.

Arrewheed (Needle Point) Projectile, such as 5 cm PagiPate 40 for 5 cm Pak, was a 50 mm AP proj which consisted of the following components: a pointed tungsten carbide core cemented to a steel body which had forward and rearward flanges, a plastic strowhead shaped head covered with a sheet steel ballistic cap and a tracer assembly. The forward flange acted as the rotating band, while the rear flange acted as the bourster.

"The Past 40 was fired from a normal gun. On striking the armor, the ballistic cap, the head and the body with ocities and high armor penetration at short faires and the penetration hale was small in comparison with caliber (See also Tapered-Bore Gun Projectite). There were also 37 mm (3.7) cm PagrPatr 40), 47 mm (4.7 cm PagrPatr 40) and 75 mm (7.5 cm PagrPatr 41)

arrowhead type AP projectiles,

According to the second of the



Gaine

Shoul Tungsten arbide

Core

Groove

**Plastic** 

Nose

ARROWHEAD PHOJECTILE

Arece Projectile 'spfeilutabiles Genchous' in a sleader, very long, fin-subilized subcaliber projectile fired from a smooth-bore gun at aupermenic velocity. Its development which is described in Ref I may be considered as one of the outstanding German achievements of WW II Some of these projectiles were used in the attack on the Maginot Line and were enccessful in penetrating concrete. Their subsequent use was confined to the Rubsing front.

# ARROW PROJECTILE

1) H. Kurzweg, Die grundskralichen adrodynamischen Haterauchungen zur Entwicklung pfeiletabiler Geschosse Schriften der Deutschen Akademie der Lufdahreforethung. Nr 1059/43 (1943), pp. 33-71

2) L.E.Simon, German Research During WW II J. Viley, NY (1947), p 191

3) Dept of the Army Tech Manual, TN 9-1985-3 (1953), p

Note: According to H.H.Bullock and G.Coghian, the shove projectile was also called a Needle Shell. A projectile available at the Bussum of Picatinny Assenal was 105/60mm caliber and about 760 mm long (Compare with Rochling Anticoncrete Projectile).

(See also Gesenet Projectite).

Arsunals and Explosives, and Ammunition Plants. See Var-

Artillerie (Artillery). A list of German cancons etc may be found under Wespons. (See also Taschenbuch für den Artilleristen published in 1937 by Rheinmetall-Borsig).

Artillary Ammunition (Complete Round). See under Granate. AS. Abbreviation for Ammonsalpetersprengstoffe. (Explosives

based on ammonium nitrace) [ Weichelt (1953), pp 39, 375 ]. A5-3 . One of the German priming (igniting) compositions used during WWII in some electric fuseheads. It contained red lend 77, milicon 19, NC suspended in accome 4% [PB Rept. No 95 613 (1947), Section T].

ASM. See under Unterwessersprengeroffe.

A-Stoff (Liquid Oxygen) is described in the general section. It was used in some liquid propellants for guidd missiles such as the A-G (V-2). Tadius and Wasserfall.

Reference: Gollin/, Rockets mod—Birected Missiles, CIOS
File No 28-56 (1946), p. 3.

Note: According to ClOS 33-13, p No, the AS-3, which means Artillery School composition 5 (Artillerisechule 3), was an increadary composition prepared by mixing 75 perts of red lead with 25 p of silicon made into a paste with NC [elly.

Assisted Toke-Off (ATO) Units, See under Rocker.

Autrolit (Astralite), A type of mining explosive similar in composition to Ammonit and Donarit. Typical compositions are given in the following Table 3a:

Composition (%) and some properties	Astralit 1	Astralit 2	Astralit 3	Astralic 4	Astralit O N
Ammonium nitriste	84.5 .	80.0	79.0	68.3	- 30.0
TNT + DNT	7.0 '	12,0			-
Vegetable meal	" 1.0	3,0		Į.	
TNT + DNT + meal			17.C	27,7	20.0
Charcoal	1.0	1.0			
Paraffin oil .	2.5				. •
Nitroglyceria	4.0	4.0	4.0	4.0	
Oxygen Balance,%	-	-	+2.5		+0.3
Trauzl Test, cc		- }	39%	-	375
Pb Block Crushing, mm		- 1	16.2	-	16.0
Sensitiveness to Initiation (requires)			No 1 Cap		No 3 Cap
Propagation in 30 cm Cartridges	-,		. 12.0cm	' '	80cm .
Velocity of Deton-	- 4		5400		4900 ~
Density of Cartridge			1.09		1.03
Heat of Explosion, kcal/kg			957.	^-	1006
Temperature of Ex-	•		. 2170		22.70

"See Propagation of Explosion in Cartridges, described in the general section.

1) A. Marshall, Explosives, 1, (1917), p 397 2) P. Naoum, Nittoglycerin (1928), pp 423 & 426.

Athylphonylurethan (Ethylphenylurethane) was used as an ingredient of some smokeless propellants (as a stabilizergelntinizer PB Rape No 11,544 (1945)

Aural or Inspire, See T-Scott.

Ausbouchungsprobe (Expansion Test), See Trauri Lead Block Test in the general section.

Ausschwitzungsprobe (Swesting Test). See Exudation Teeg in this and in the general sections.

Azoron (Acetone). See general secrion.

Axide (Axides) are described in the general section, (See also this section under Bleinzid).

Annimid (Setakateffwas perateffusions) (Hydroxeile Acid). See

Bud A vonicie 12' long, o' uide nauf d' high pouvided with i de cylinder engine (in six man); a melle nau a space far the driver. Aret heading the which with some description Chirgan, the six of the six of the control of the control Chirgan, the six of the six of the control of the control chirgan, the six of the control of the control of the control chirgan, the six of the control of th

No (Bookum 349 Monifol. Son Nature Be 349A and 3498 Smallmit, One of the mining explosives: Am nitrate 85 and

THE 15%, (E.Colver, High Emplesives (1918), p 249 ].

"Better" See "Hermer" senered vehicle listed under Penner

Bullistione Burilidigung (Bullistic Subility): See general

Bulltuite so 10°C/80 (Wilefelpalver/39) (Cabe Pointer of 13697 (Ballistin) Dark gray propellant consisting of squal parts of NG and collusion cores significativity 0.56 to 15 of DPhK and vaccilia, it was adopted in 1809 by the Greene Navy. Less receive compositions were introduced in 1897 and 1900, under the sivelgenties of RPC/97 and RPC/00, white RP desails for Rithmanulver (tube powder) [ Marchell, v1 (1917), > 303 );

Bandtoch Pulver van prope by congressing the Schuline Pulver later praise of high density [ L.Gody, Traind don Macières Explanives, Names, (1907); p 469 ].

Bengaler's Torpado (In Rabe publibe Reibenladens), See

Bir (Bear). One of the experimental make (for under Prayer).

Sorytique (Poudes) . Under this title, Daniel, Dictionaire (1902), p 57 gives a minute of 8 parts of black powder with 2 paper of Ba nisseer. It was used in the '1860's in larger cullber mas.

mustle (Comen).See under Collulese in the senson) se

Beholfsmine Classoviand or Majorabile Minet, Several land minor used by the German during WV II were made from issue not specially decised for mines. For incom-Behalfenine W-1, A/P was improvised from capemed 50 mm mercer shell. Several improvined land mines are described se pp 279-85 of TM 9-1985-2 (1953).

Beiledung. Sen Benner Charge und under Ignitie

Salité (Bellite), One of the Sprengel type explouives, it was also need in England and other committee (See in the general

Boot Burrel. See Krammeland.

Beckethingspresheapetees (Observation Round). I round with a projectile which had a case of ME, a fur the control person and a phosphorus filler in the control person and control person are control person are control person and control person are control person and control person are con

The purpose of this round was to indicate the exact location of a hit by means of a puff of money (produced on ignicion of the phosphorus).
Reference: A. L.Dere, Ordanice Serguant, Dec 1943, pp 357-61.

Swelwite 8-According to L. Midard, Mija Artil Fr 22; 196(1948), the Berclavite B is one of the older aluminised explosives: Am nitrate 79.5, DNT 5, NG 5, colledien cotton 0.5. Al 5 and cultulous 5%; power by the French lend block expansion, test (modified Transl test) is 125, taking the value for pierie seid as 100.

Berger-Minchung (Berger Minture), A sanke-producing minture esed of 2 pains of sinc dust and 3 per of beanchisess U S War Dept Tech Manual, TM 30-506 (1944), p 23 1-

Burgmann-Jush Soubility Tant. See general section under Stability Teats.

Sinists ader Voldinmung (Tamping at Stembing), Spa gener

Boschussprobe (Shooting Teet, called in the U.S.A. Rille Bullet Teet), it is similar to the US twee described in the general section. The German tent in conducted according to Benthischen, Spoing and Schienotoffe (1948), p 122 by firing a standard infancry citle, from a diamance of 23 moures.

Binazi Cantinumo Present for the Production of Mino-stymeth and Minostynai no used at the Dynamic A.G., Robisbasch Fasick in described by Dre W.B.Little, D.B.C.Lippy, BROS Emal Rept 1842 (1946) (See also under-present

Bildel Emissives Several compositions were passessed by C.E.Bichel at the end of the last century, among them: a) NG 100 perm mixed with 10 p of sulfament processes. b) No. nimme 90-100 p mined with 5 p of nitrocumene and 10 p of sulferested car oil, c) Am nimes 86 p mixed with 8 p of TNT and 6 p floor or storch.

Big Bortha Gus. See process) paction

Bibirhit (Bicarbin) A type of permissible appleative containing large amounts of sodium bicarbance and small amounts of MG, petersed by WABA-G before WW II. Those explorives, although they contained a large amount of NaMCO, and a small assume of MG, were very easy to initiate. Mixtures containing as much so 95% NaMCO, and as links as 7% MG could still be initiated by collinger flage

The following are the composition and properties of new of the bicarbines; NG.15, MeSCO, 50 and NaCl. 35%; temp of explosion 400, value of desig. 2500 m/sec; best explosion 162 heal/kg; d-1135. Teanil test value 30 cm tw a 10g sample, specific pressure 610 stu x 1/kg, beisones value: (Kaşi) B = 4 x (op prica) x (val of duc) x 10 x 2.06, pap not value (Dominciae ellectra guagacciae odor Schlagweiterprise) 40 cm, required for initiation of louer n No 2 Maching cap; volume of games evolved oil emplosion of like in 258 I ac 20 and 760 mm Hg (H O in vapor phane).

Composizion of games: CO<sub>2</sub> 46.1, H O 43.2, H <sub>2</sub> 5.2, and D 1.5%

Note: Then e more brisant explosive is desired, the am of NG is increased, the naments of NaCl and NaHCO's are decreased and rome fact and exidiner are incorp

The following mixture may serve as an example of such a explosive: NG (slightly gelatinized) 30, Natico, 40, NaCl-12.5, wood meal 4.5 and NaNO 13.6%; temperature of explanton 1400, veloc of deton 4000 m/sec. d lid. Trauxi sent value 124 cc for a 10 g sample, gap cent value 30 cm; could be initiated by a No 2 blesting cap.

The bicarbites were comparatively expensive, but they proved to be very sale for use in gaspous or dusty coal

Reference:

C. Beyling & E. Drekopf, Sprengutoffe and Zlindmittel, J. Springer, Berlin (1936) S.ithographed by Edwards Bros , Ann Arbor, Nich), pp 145-146.

Binguit Mintura A. See under Amatol 39.

Block Powder, See Schwarzpulver.

Blasting Cape See Detonnere.

Blasting Galetin, See Sprengerinting.

Slibrehensulver ader. "B" Pulver (Leal Powder or Flake Propellant). According to Stattbacher, Spreag- und Schlesstoffe (1948), p'41, it was prepd by colloiding a mixture of 3 parts of guncotton (Schiesewalle) of N content minimum 13.1% and I p of soluble NC (Kollodiumwolle) of N content 17.6%. After incorporating into mixture 0.5% of the stabilizer (DPhA) and 1% of flash-reducer (Na oxalate), the mass was flaked and tirred. The resulting linkes (which were 0.3 mm thick and had a surface of 1,3 min ) were surface-treated with centralite and finely pulverized graphice in order to make them progressive burning.

Biotonid (Lead Aside) (L. A.). See general section, uniter Asides. It was used in Germany in some priming and initiat-

was prepd in Germany during WW.II from sodium azide and lend nitrate in the presence of dextrin, in the following

a) Filty liters of water commining 1.5 kg of andium axide was added alowly to 60 I of an aqueous solution containing 5 kg of PhNOm and 0.15 kg of dextrin, prebeased to 600 and stirred by air. After adding the first 5 liters, there was a paule of 5 minutes. The remaining 45 I, was added during the next 45 minutes, and the stirring was continued for 15 minutes, while the mixture was cooled by means of cold water circulating through

b) Following this, the reactor was tipped onto a filter and the LA serained on a filter cloth made of horse hair. Suction was applied

c) After rinning the L A with neveral portions of water, it was pinced on sheets of paper attached to france and dried to a mojeture content below 0.1%. Drying was done by blowing air for 48 hrs at 45-500 through the

chamber containing the frames d) After cooling to 20% the contents of each wheet were transferred to a graphited cardboard dish. The desired amount of dried 1. Se was added to the name dish. which was then sent to detonator manufacturing plant.

(Yield was about 3.3,kg per batch). In order to destroy any I. A remaining in the mother liquor, about 5 liters of nitric acid (50 Be) and about 1/2 I of concd No nigrity goln were added per batch of L.A. Reference: Pli Rept 95,613 (1947), Sections O & P.

Noves: According to L.M.Sheldon, "Manufacture of Initiating Explosives," etc." GIOS Rept 27-3R p.3, the measufacture of L. A at the Kohtnetheusen Plant of Dynamit A G was considered in a large, well-polished, stainings areal, roads considered in a large, west posterior, estimates state, tomos bottom, cylindrically vessel, facketed for circulation of heating of cooling water or brine. Agitation was conducted by one centrally located shaft having 4 blades as shown on the attached drawing. This agitator could be raised or lowered as required to provide



most effective position for securing the denired mixing. For discharging the AGAI TATOR contents of the seaction vessel the agitator shaft was raised clear of the kerele which was shee tilded by a con trol wheel located on the supporting framework. Stock solutions, 9 to transwork. Stock solutions, y to 10 % by weight of lead nitrate and 2.7 to .5.0% by wr of redium axide were kept in large vessels placed higher than the reactor in order to accuse the flow of liquids by gravity.

accuse the flow of liquide by gravity. The correct volume for, each preThe correct volume for, each preThe correct volume for, each preto the lune of calibrated glass beciers,
Before proceeding with precipitation the alkalinity of the
column acids polution was cheated by tritang with normally
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me trustice repeated. Utilianty, up water was used in making the action solutions, under the control of the of ontition required to give 4.3 kg, of actual lead airms (500 I when using a 5% islen) was dipart from the impely take and newsured in a traitment disease bottle from switch it was trapilized to the reactor. (This amount of trust withinky is about 18% in excess of that, theoretically required).

is about 1875 in excess of that rhomestically required). After bequipe the sale to hose 1570 some dilute sockine hydroxide was added until the soin became neutral resultly craspe, an attenuable by a pope place text. After mental control of the soil of the so

After addition of the Na, axide soln had, been completed, the agitator was stopped, the lend axide allowed to service and the mother liquor decanted by Itling the wassel. After giving one dilution wash directly in the reaction weather it was titled and the precipitate transferred by means of n was titted and the precipitate transferred by means of a jet of where onto a large cloth (lifer supported on a natural draining filter. After classing the lead saids with these saids and the control of the control

A sample of each batch was sent to the laboratory was the crystall were examined microscopically and compared with acceptable standards. Then part of axide was dried and its loading density was determined.

for destruction of anwanted L A, it was treated successively with a 15% of the said sole and an 8% Na airtist

Note: Crystalline structure of LA is described by G. Pfeffetkorn in the Zeitschrift für Naturforschung 3a, 364 (1948).

According to W.Schneider, Sprengtechnik No 10-11, pp 185-196 (1952) and Explosivacoffe No 1-2, pp 1-10 (1953), technical L A (purity 92-94%) used in German Sprengkansel A and Sprengkapsel B becomes dead-pressed if the foating pressure extreds about 900 kg/cm2 (about 12,800 pail depending on conditions. Perfectly dry LA can stand higher pressures without being dend-presse, but LA conGer 13

mining molecuse is easier to deed-proce. Crystal size alon affects the presents at which dead-pressing occurs.

(Travalacia Proto ) Bloiblocks Times oder Bleimflindesprate anch Traus, (Traus) Lond Black Toot), See general section and the books of

probe-Some on Bleibbekaus benehma nest Lead Block Espainter Toot.

Bleibiegt templang sprato(Lotal Bleck Compression Treet) Spareiprobe. See Crunber Tout in the general nection.

Sistemand (Lord Musside), PhO. See general section.

Biolattrat (Load Ritmer)clige general section.

Blatchyd, oren ader Blatenydelenyd (Red Lond Oxida),Phy Oat for govern! section.

Slolenydel. (Cond Substide), Ph.O. See general section

Blotpermyd (Lond Prescrite), PhO, See general section sides Permiden. Was used during WV II as par of the ingradients of functions compositions such in in the Spate Functioned of high tension: PhO<sub>2</sub> 33, Al (crembed finite) 33.5, special Mg alloy 33.5% [PB Rept No 53.877 (1946). pp A3/34 and A3/35 1

Ministers (Land Piccose) (L.P.). See profful section under Picraton; was mird in Germany for the proporation of ignicles minutes in inschard manufacture. The following method were speed for the perpenation of load picrate by the action If load atomor on pieric solds

Place 3 1 of lend nitease salisties (containing 180 g. sec "line) into a small stainless steel vessel (VSA swell) similar de conscricçios to those weed in load axide manufacture, and provided with a weeden extered Add 15 1. of See water so that the temp in the vessel is about 60. Food in gradually (within 5 minutes) with whence Co. From an government of the continues of the continues of a department of the continues of the cont ng the slowy to sente med the solutes of the Pin-just distinguished through the matter injust, some the vacuum pump and ign it run for 3-4 house. Life the cities diber and transfer the L P to a intainless stood energing per containing 10 1 of 96-98% echanol denorwest with 2% of methanol, together with 500, whiled 30% squeeze lend airries solution. After thesesable mixing the long produces (by means of a vector aperalo) manufer the altery back to the calice liber clock on the Nameh. fallow to portly for about 1/2 hour and thou operate the vacuum puise for 1 to 2 hours.

Nose: The extent of the drying on the filter should be ger erned by the fact that the pastir has to be not enough to ement is a fairly thin layer on paper for unbrequent drying.

Place the valice filter cloth countaining the L.P. in a popier-miche buchet and wannier is to the divine house. By means of a wooden spatule, smeat the moiet L.P. upon a double sheet of paper 2', x 3', placed on the

cloth of a drying frame. Dry the material for 4 hours. starting at room tone and raising it to 40° and finally 10 AGD

Note: Caking usually results

Transfer the Lond Pictate into papier-miché con-inance (vield of dried material about be about 2,2 kg with Ph contest about 62%), provided with reborr areaners. Screen the material, by placing 500 g. at a time, together with a subber atopper (about 1 1/2 siem and 2 auch) into a cylindrical nieve 18 diam by 6 deep, provided with a nilk nieve cloth, 600 menhes per pq cm. Sense this his red material in attornered papers me

robber compiners until sendy to use. Here: After limiting the precipitation of the L.P., the vennel, should be closed before being used again by stieries with 4 I of 5" Be sierie seld and 100 1 of water.

1) G.Anherofe et al. Inventigation of German Con Explicatives Industry, \$ 1 0 5 Final Report No 853, Iven No 2, Loudon, H M Sectionery Office (1946); PB Rope No 63.877 (1946), » A3/27 2) Anon. Pft Rest No. 95,613 (1947), Section D.

Blatpleremerobs. See Load Place Test is the graces! section.

Bisturioseer (Load Missaye), See general section, a

calant citer Blatstynhaut (Lond Trinitro-

resercionse or Lord Styphonic) (L. Sr.) Bio: Sale dec Trizino Triulege oder Trickies. See present vection under Styphnic Acid and also the references lined below. One of the methods of projection of Germany during WW II was no follower Transcrementation (TMR), culled Trinin; ( 72 kg 1 was sciered into 120 I of water containing 12 kg of MeO necil the Dift disselved. Then the solution was dibeed with water sadd it contained 2.4 kg THR for such 40 1 of solution. The resulting mixture contained mag-

daerciante. To 40-1 of the above mixture, prehensed to 600 and stired ist a vessel, was added gradually (during 20 name) 12.5 1 of an an solution commissing 4 kg o lend nimuse. This pave lend styphests. After allering Cobo mintion to smad and traditive is to 200, they meeter limer was decrared leaving the spc of L.St. As some L. St. remained in the mother liques, it had so be deausy-of This. Will have by adding some nedicin curbonies of the strangerund the L. St. into No stypinger and

white makes the level as PhCOp.

After removing the PhCOp. The sensiting liquid was biddled with vents and and the prouding stythate schools to a sensiting by means of sensiting to a sensiting triuming by means of frim filings (Ref 2).

According to Sambacher (Ref 3), L So may be peoplely sizing the building solute of trinferencercinel (previously neuralized with Na carbonate) and load airmin.

According to Nation (Ref 1), L St has been used a on initiating explosive in Germany since about 1920 when the bb-called Trinimatipoelie (q v ) were pur on the medias by the Rheinisch-Teufflische Sprengenotte A.G. Several types of iniciating compositions used by the

Germano during WW II conceined L St

(See also under Primary and Initiating Compositions), 1) P. Narum, Schiaus- und Speragninife (1927), p 186 2) PB Ress 95.613 (1947), Section N 3) A. Smuhacher Serene and Schiennsoffe (1968), a 40

se: L.M.Shelden, Manufacture of Initiating Explor , CIOS Reps, File No 27-38 (1945), pp 9-11 deer method of manufacture of J. Sc. at Vollentohausen 1

20 kg of MgO was added. The mixture was heated to a musin cloth and then diluted to 6 Be and allowed or

a manife cross man tree during which time the comperature dropped to 25-30, b). In carrying out the actual precipitation, 86.4 f of 86 acin was elecanted from the accuse vessel and 6"Bé solu was viscanted fron the storage vesseri and transferred to the procipitating wasnel where it was behave to the procipitating wasnel where it was behave to the procipitating wasnel where it was the procipitating wasnel has spen added the Contents of vessels wave cooled to 25° as rapidly as possible and the agintation was stopped in order to allow the LS to settle. After gr-mouring the mother liquod by decanation two dilution tensions been given to the pecipitate directly in the vessel. Then the product was transferred by means a means of water opto a cloth filter where it was a arran bl ware onto a cloth liles where it was a thoroughly Hausel using the same exchaigue as fed dastriasted b. A. The yield of 18. S. C. Co. Rep. 10. 24. I fellowing method of manufacture of L. S. was used at oisdest Plant; Dyhamit A.-G.:
lato a stainlean kizel kentle of about 10 (British) gallon

capacity (about 45.4 liters); provided with an agitator were introduced 40 l of water, 2.4 kg of styphoic aciwere instruduced soll of water, 2.4 kg of styphoic acid and 0.44 kg of styphoic acid and 0.4 kg of styphoic acid magnesium styphonath developed beat, and when the respectative reached show 55° C, a solution of 4 kg of lead nitrace is 1.45.3 of waser was run in. The yield years 5.5 kg of 1.34.

was 5.5 kg or L 5t. la all the above methods of menufacture of L St the vessels were similar to those used for the manufacture Par the destruction of L St in the mother liquor, an excess of sodium bicarboants was added and, after mixing theroughly, iron tilings followed by sulfuric soid were added

Get 14:

Blottriningt. Same an Bleiteinitrococorcinac

Bleigylinderprobe noch Trauzi (Bleiblocksusbauchus morabe). See Traux! Lead Block Test in the general section. "Blifanulver". According to Stettbacher, Spreag- und Schlegu-

stoffe (1948), p 99 it in one of the names for Nitrodinzobenneneperchlorate, CaHa(NO, N. ClO, which is described in the general section under Diazobenzeneperchlorate.

Bebbinis. See Bobbinite in the general section.

Babrautradu O2 (Bhr Patr O2) (literally Drill Carridge of 1902). A demolition charge consisting of 73 g of TNT used at the time of WW I for military pioneer work. It replaced a similar charge made of picter acid and called Bohrpatrone 88 | Colver, High Explosives (1918), p 23 |:

Schopetrone 28 (Drill Carrridge of 1928). A blanting careridge, described under Demolition Charge. According to TM. 9-1985-2 (1953), p 277 the charge was used also in antiperspanel land mines such as Stockmine.

Bank Cantalners. See order Contain

Cylindrical photoflash bomb

Chemical cylindrical bomb

Armenierciae (AP) bomb Armer-piercing (AP) bomb, thick walled

high capacity

Concrete framewateriou bomb

Anti-personnel (Small) bomb

Cement, cylindrical bomb.

fragmentation) homb

Cylindrical amoke bomb

Torpedo bomb

BOMBE (Bomb). Table 3b gives the designations of ermon bombe and their English activatours.

High capacity (HC) bomb (Bomb of maximum blast)

High-explosive cylindrical (General purpose) bon

High-explosive thick walled (Semi-armor piercine

Historylonive (Demolition bomb) of

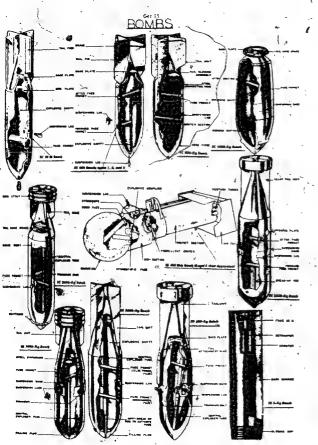
Fragmentation (Arrivogrammas) bomb

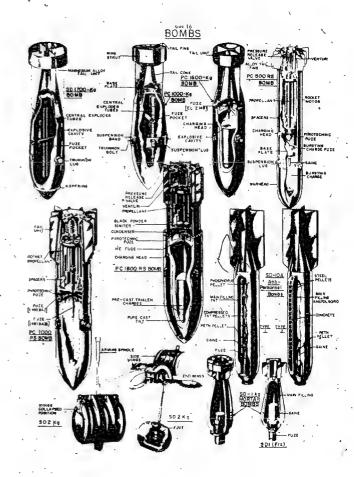
Table 3

Blitzlichtevliedrieche Bombes Torpedo Kampistoficylladelas Nebelcy Lindois che Panterdurchuch bucy limbiache Pasaerdickwandiah PD a Spresghombe Splitterbetoe Spreamylindrinche Speen adic kwandige (klein) SD (klein) Sprengdic kwandige Selimer Zementcylindrische 75

Note: The two principal German HE bombs were SC and SE. The SC, or general purpose bombs, had loading factors of 30-578, and became of their destructive quality were used primarily for general demoiston. These bombs were shally of three piace areal construction, with the some being welded to a tubular body and the sheet steel or alloy tail being structed to the bomb hody by accewe or rivets. The SC bombs were not streamlined. The SD bombs, being either AP or SAP, had a joiding factor of about 35% and, because of their passersaire qualities, that used primarily against ahips of fortifications. The bombs were accamilised said had thicker wills than the Sc. They were usually drawn or forged in one piece. A tail extension with a dummy wraws or torgod in one pace. A rail extension with a dummy fase head was generalized attached to give the bomb a most streamlined appearance. Other bombs SA; SB, SBe, etc. may be characterized as follows: The SA and SB bombs were thin walled with

loading factors as high as 80%. They were designed to give maximum blast effect. The 58s bombs had thick ton-trere walls resinfected with sarel and their loading factor was about 20%. They were illed with 4 low power apploating and were usued for the same purpose as 50 m. The 70 bonds and were used for the same purpose, as SD a: The PC books were AP and used remainly against phis and fortifications. They were slightly streamlised with a heavy note chardened, can breat) and heavy wait in factor men's livin the chickment decreasing toward the base of the homb. Thus, the contract the same of the course of





Ð

bombs constructed from concrete. The BLZ, KC and NSC bombs resembled in appearance the SC bomb by bad different fillings. The SP, tragmentation, A/P bomb is not described in TM 9-1985-2 (1953)

The following bombs are described in the U.S. Dept of the Army Technical Manual, TS -9-1985-2, Gorman Explosive Ordnasce, Washington, D C (1953) p 1 to 124.

1) SC 50 kg Bi was filled with 24.4 kg of cast ThT. amatol or trialen (p 6)

Note:TM 9-1985-2 (1953) does not give the German equivalent of Bi but himply says that the bomb had a one-piece cast steel body machined, all the firrings were welded in place. 2) SC 10 kg Grade 1 / In, L, and Stabo were filled with 21 to 25 kg of cast TNT, powdered smatch or cast

runden (n.6) 3) SC 50 kg Grade JI - JB, JC/- J and J/2 were filled with 21 to 25 kg of TNT, amerol or males (p 7) 4) SC 250 kg - Types 1, 2, and 3, J. L. L2, B and K more filled with 287 lbs of smatol, TNT, TNT and wax,

be-wood meal and Al powder and naphthaleue and Au aigrate (p. 8)

5) SC 500 kg Grade III (E. L2 and 1) were filled with 220 ha of amerol. TNT or trialen, Bombe recovered with relates filling contained also up to 500 cylindrical purposer trapped pellem composed of RDX/Al/war(p %). " 6) SC 1000 kg "Hermann" (C. L. and L2) were filled with

about 500 kg of assetol, TNT/Al/wood metal or triales 7) SC 1200 kg was filled with 652 kg of trialen.

8) SC 1800 kg "Same" was filled with amotol, TNT or triales (p 11)

9) SC 2000 kg mps (filed with 975 kg amotol (p 12). 10) SC 2500 ha MAX was falled with trialen by a mixture of anatol with BOX and Al powder (p 13)

11) SB 400 kg Kugel K - "Kurt" Apperatus was filled wish 300 be high explosive. It was a "skip" bomb designed to operate has a skipping atoos over a smooth water surface for use against ships -- power plants, lock eates,

etc. (pp 14:16)
12) SB 1000 kg was filled with 735 kg RDX/Al/wax bencuirs in a Trisles 106 magis (p 17)

13) SB 1000 kg Pamchuse was filled with biscuits consisting of Am nitrace 51, Ca pitrace 31 and RDX 16% in matrix of DNB 48, RDX 15, and Am number 17% (pt-2) 14) SB 2500 kg was filled with 2400 kg amatol or Triales 105 'P18)

15) SD 50 (U50, D500 and D50L) were filled with 16.4 ks TNT (p 19)

16) SD 250 kg (D250, D250]B, D250L med D2500L) were felled with 79 kg TNT to 201

17) SD 500 kg, SD 500 A and SD 500 E were filled with about 200 kg ametol or TNT/wax (p 22)

18) SD 1700 kg was filled with 730 kg of TNT or amatel

19) PC 500 kg, D 500 E, and D 500 Tywers filled with about 75 kg of TNT, TNT/wax or ametal (p 24) 20) PC 1000 kg, ESAU was filled with 160 kg TNT/was

(p. 24) 21) PC 1400 kg, FRITZ was filled wen 500 kg of TNT/

wax or triales (p 25) 22) PC 1600 kg was falled with 130 kg RDX/AL/TNT matter (p 26)

23) PC \$00 kg RS was 'tilled with 14 kg TNT (p 23/ 24) PC 1000 kg RS was filled with 54 kg TNT (p 29)

25) PC 1800 kg RS was filled with 360 kg of TNT and trialen. One specimen had I blocks of NGs in the none and 10 blocks of RDX/Ai/wax is two cardboard cylinders

in the body (n. 30)

26) PD 500 kg was filled with 32 kg RDX/Al/wax to the body, associated with a nose filling block of NGu (p 31) -

27) 0.5 kg A/P Parachute bomb contained I oz of an explosive (p 32)

28) 1 kg SD 1 Morent continued cast TNT (p 33)

19) I he SDL FRZ contained amatol or granular TNT The FRZ was a French bomb used by the Germans (p 31) 301 7 kg "Butterfly" SD 2A and SD 2B was filled with 3.5 oz of cant TNT surrounded by a layer of hiruminous composition (p.34)

1)) SB 3 kg contained 4 lbs of an explosive (p. 35). 12) SD 4 kg HL (hollow charge) A/P and Vehicle contained 12 as of cast TNT or 46/54 - TNT/RDX (p 36) 33) 5D 10A Types I, II and SD 10 FRZ contained TNT or amarol (n 48)

343 SD IOC contained about 0.75 kg of an explosive in 193 35) 12 kg SC 10 Concrete contained 0.9 kg TNT (p 40) 36) SD 13- Conversed Projectile contained hollow (shaped) charge explosive (p.40)

(37) 5Be 50 kg Concrete in earlier specimens contained TNT. and in all later bombs a nephthelene exploure mixture of low brisance (p. 42)

18) SBe 230 kg Concrete contained TNT pellets and a misture of Am nitrate with small amounts of wood meal and Al powder (p. 43)

39) SA 4000 kg contained biscuits of RDX/AI/wax in a matrix of 50/50 Amazol (1943).

39a) BT (Bomben Tospedo), 206 kg, 400 kg, 700 kg and 1400 kg (p 44)

40) 2 kg Assessats Towed Paravane was filled with a HE in 461

41). 3 kg, 1.3 kg, 2 kg and 2.2 kg Incendiary contained thermite as the incendiary and a RE as the burnter charge (pp. 46-30)

42) 30 kg lacendiary (Sprengbrond C 50) contained thermite as the incendiary and TNT as the burstes charge

43) 250 kg Incentiary (FLAM) contained an oil incendincy mixture and TNT as the burnter charge (p. 52). 44) 500 kg incushings (FLAM) contained a mixture of 70/30 - percolcum/benzana se the incendiary and TNT so the burnter charge (p. 54)

45) 50 hg incrediary (Brand C 50 A) contained about 30 lbs of a mixture consigting of benzine 86, phosphorus 4 and name rubbes 10% (p 54)

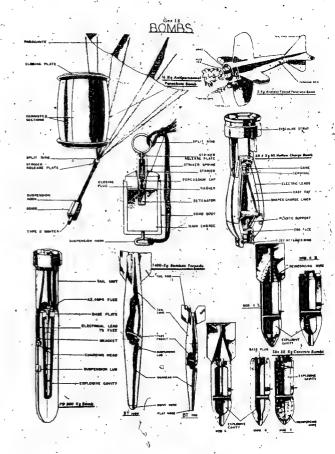
40) '50 kg Incendiary (Brand C 50 B) contained about 77 lbs of white phosphorus (p 55) 471 250 kg lacendary (Brand C 250 A) Types I and II.

contained a mixture of petroleum 87.7, polystyrent 11.7 and phosphorus 0.5% (6.56) 48) 50.kg Smoke (NC 50) contained a light grey smoke

producing substance smelling atroughy of camphor (p. 58 49) 50-kg Smoke Market (NC 50 WC D/SEE) contained as unidentified amoke producing composition (p 58) 50) 250 kg Smoke (NC 250 S) contained a maxture of sulfue trioxide 60 and chlorosulfonic acid 40% (p. 593 31) Practice Bombs: SD 1, SD 2, ZC 10 kg Concrete, ZC 50 kg Concrete, PC 1000 RS EX. and AC 250 kg Concrete are described on pp 59-65 of TM 9-1985-2

52) Parachure Flares: LC 16 Single Camille 1 it 56 Single Candle, LC 50 F Augl C Four Candles, LC 50 Ausf E, LC 50 F Ausf G, Mark C 50 FA, Mark 50 Kark Targer Indicating, Mark S. Types 1 & 2 and some others are described on pp 65-79

33) Smoke Flares Orange were used as ward drift



indicators (pp. 79-80) 54) Smoke Signal Flures and Distress+Signal Torch

55) Photographic Flash Bomb, BLC 50 (p. 81) 56) Photofiash Bomb, BLC 50 (p. 81)

57) Tareet Indicator, Red (p 84)

58) Marker Bomb (Sea) (p.85)

59) Sen Marker,"LUX EZ"50 SC (p 86)

60) Single Unit Ground Marker, Mark 3, Green (p 87)

61) Parachuse Recognition Smoke Generator (p. 89)

62) "LUX N" (Flame Float) (n 92)

63) "LUX S. (Flame Float) (p 93)

64) Cluster Containers: BDE 10, AB 23 SD 2, AB 24T SD 2. AB 36. BSK 36, AB 42. AB 70 - I or Mark 70S. AB 70 - 3, AB 70 D 1, AB 250 - 1, AB 250 - 2, AB 250-3. AB 250 KZ, MK 250 LK, MK 250 BK, BSB 160. BSB 700: B&B 1000, AB 500 - 1, AB 500 - 3A, AB 500 - 1B, ARB 500; Mark 500 Bodes and AB 1000 - 2 are described

ee pp 93-120 of TM 9-1985-2"

, 65) Meanage Tubes (Sea and Land) (pp \$20 - 1). Mt. Hehlladung (hellow charge), MK Mark, MFB Monoritro-behaune, MGe Nirroguanidine, #5 Rocker-annised, PG. Asmer-plescing, PD Asmer-piegeing, thick-walled, \$4 High capacity (HC), She Concrete fragmentation, SC General numone (GP), SD Antipersonnel, ZC Cement cylindrical.

(See slao Abbreviations at the end of the German section); References: 1) Technical Manual TM-E-9-1983 (1942), "Engay Bombe.

nng runnu 27 Dautsche Abwurfmanizione, Berlin (1943) 3) Tachnical Manual TM 9-1985-2 (1953).

"Rombe BV-226" of Blohm and Voss was described on 99-100 of the book A.Ducrocq, Les Armes-Secrittes Allemenden, Berger-Levrault, Paris (1947).

Bonk High Emplories Troin Concof the German RE trains used duling Will in bombs consisted of the following parts: A. Electric primer. A ailver bridge wire with a bead, which consisted of a passe made of lead styphnate, collodion corros and amyl accetate, dried after applying, in order to increase the flame produced on ignition of the head by the red hot bridge, the bend was surrounded with 80/20 KClO /sharedal?

B.Delay. Composition for the delay element varied, de-

pending on the desired delay time. a) Delays up to, I second commined black powder. b) Delay 3 to 14 seconds consisted of KClO4 10, PhCrO. 50 and natimony 40%. As this mixture was difficult to ignite from the bend of the igniter, the following ignition mireure incilitated this operation; red lead 25. NC 5, carborundum 20%. In order to intensify the flame of the delay, the following booster composition was used KClO4/56. Pb ferrocyanide 38, resin 6%. c) Delays up et 40 seconds contained BaCrO, 78.0, Ze 21.0, K Cro 6.4, NC 0.5, was 0.1% and were used in conjunction with the similation mixture and hooster, as described under (b).
C. Reley. Two kinds were used; black powder, or the follow-

ing mixture: ECiO, 25-30, Pb (SCN), 40-50, NC 20, sulfur D. Detension contained land axide, sensitized with lead

styphnate.

E. Sub-honorer consisted of a layer of PETN over PETNwas missure contained in a cup, called the "gaine. The gaine was autrounded by a pressed PA ring with the estimander of the fuze pocket filled with pressed P.A.

pallets to act as a booster.

F. Auxiliary beester consisted of pressed TNT pellers Note: Practically all German bombs contained as suxifiary booster; which was intended to assure the detonation even when -using low grade explosives for charging bombs. The following were the principal explosives used in

German bomba: TNT, TNT-wax, Amatol, Ammonal, Cycletol, Hexamics and Torpex.

[ Allied and Enemy Explosives, Aberdeen Proving Ground, Md. (1946), pp 167-9 ).

Beester, Beester Cherge, Geine (Zilndladung, Briladung, Schlagladung, Anfeuerungsuarz). The German booster was a cylindrical alumnum or brass constance (garas) filled with a HE (such as PA, 'PETN/wax or RDX/waz) and containing, inside the forward end, a deconator lilled with coataining, inside the forward end, a decoance (filled with PETN or RNZ sad a priming layer of M F for boosters filled with PA or with LA/LS is yet in other insent. The purpose of this most of the filled priming layer of the proposed of the proposed of the fure decoance, to smallify the filler of the shock wave, and, in turn, its detonate the man booster charge. The properted P A filling was in beast contineers. The PETN/was and RDX/was fillings were in compensant form, timed, respectively, page pain and Pale

blue & blue-green.
The following Table 4 lists the boosest charges exacinet

	traconi, Dover, New Jersey (Ref 3
Composition %	Uses
90/10- PETN/Wax 89/31-PETN/Wax	37 mm HE. shell, 75 mm AP shell, 128 mm HE. shell, 130 mm moreur bomb, HeC. magnetic- grenade, A/Triffle grenade, HeC. riffle, grenade and 210 mm HE rocker, 75 mm HE shell, A/T riffle grenade
88/12/PETN/Wax 87/13-PETN/Wau	90 nm blotter bomb 75 mm HoC'sbell; 90 mm HE morter shell; 88 mm HE and HoC shell and 105 mm HoC shell
91/9-PETN/Wax	HC PAR 41 bomb, land mine

50 men til aheli, its men AP 92/8-PETN/Was shell, 105 mm Howshell 85/15-PETN/pressed TNT 47 pm AP shell 95/5-RDX/Wax 21 lb HoC demolition charge 88 mm AP abel! 96.5/3.5-RDX/Wax 76,2 mm HE shell Terryl (pressand) THT (CREEN, PET 75 mm AP abell 47 mm AP and HE shells. TNT (pre

40/60-Tetryl/TNT pressed) Black powder

210 mm anti-concrete shells, hand greendes; Panzerwurfmine (A/T trench monter shell) 40 mm HE shell A/T mine A/P mine Abbreviations: AP Armor-piercing, A/P Antipersonnel, &

105 mm HE shell, 150 mm and

land mine

Antitank, HoC Hollow(shaped) charge, HE High applerive,

Hew Howitzet, LA Lend szide, L. Lend styphoste, M.F. Mercuric fulminate, No. 3 person, P.A. Picric acid, PAK Antitank, Pentaerytkeitol tetranicrate. RDX Cyclonite (Flammen).

The following types of bogsters are described in Ref 1: ~ Fourier A (Lells A) consisted of an Al cylineer 2.59\* long and .89\* in diameter, closed at one and and filled with a pressed RDX/wax-92/8N pellet, density 1.61 and wighing 377 grains. The pellet was ultred bine bythe ad-

dition of a regall quantity of dye. A ceruty was formed at the forward end to receive the deronance which constanted 6.5 grains of E BEX mader 6.3 grains of L A /L Sc 5.8A.7 44.2A. in on enclosed Al teles. A disc of Al with a central bolls. I bell the deconance tube firmly in sec. exity. The example, bell by a leather wanker and on Al rain, completed the clear by pains folded over the lap of the

body

3) Sheetes & (Zeig S) consisted of an Al cylinder 4.7long and 4.37- in dissurers, closed at one and and filled
resid there BDX/war prefused pellers which tweepenchond
in two neparates Al consisters. The lower consistented two BDX/war-9-218 pellers, dynasity 1.55, and had two RUM/was-72/8% polists, dynaity 1.59, each weighing 23 gains. The container was sould by preceding the lip over rive Al discs. The upper container healt a single patter of RDM/was, (weighing 234 gains) and the demonster had come 6.5-points, of RDM under 5 gains of l. A. I. S. 65.631.6%. The container was closed by a performed Al disc. The roy container was 5 grains of LA/LS "65.6/31.6%. The contains was closed by a perfessed Al dist. The rese containers was able light the house register, and fall which we probly was read. Al excury ring, as in the Zdig A. to Beacher CAMBe (Zdig C/989) consistent of an Al container filled with a PETM/was pellet. There were two sincers a small size, 1.6 leng and A. Fin disassers, and the state of the state of the container filled with a PETM/was pellet. There were two sincers a small size, 1.6 leng and A. Fin disassers, and the state of the

These wave also benever: Zdig. C/96 (pieric neid charge), orZdig C/984p (large C/96 No beneve), haZdig \$496 (about PETN charge benever), Zdig 34 (PETN charge 1) E. Enginsburg, Ordanece Sergeout, they 1964, pp 319-30; 2) W.B.Tomlineon, Jr. Piccinney Arsonal Technical Report 1353 (1993), pp 3-16.

Baueding Steen, Same Type Motors as natiposessed Lind Mises, Schrapselinfest, such as S-46 35 and S-46, 42, briefly destribed mater Landmines.

Bounding Type Horser Shell, 20 cm, 10E. According to se cles conducted at Picutinay Amount (Ref 1), this

. The commer of the shell was, in peneral, of conseries design, but the shell less's were in two perro, the division loing at the forward udge of the boundlet. In the neer (5) of the shell (Sa spounded the Gorman Monte. Shell Fune War Z 38 and the expelicion charge mormbly (19). This was followed by the ignition tube (18), the dec-matter-beauty assembly (4) and the HE filler (beauting charge). The hand of the shell was provided with 12 line of conventional decign, as ignition carridge and peopolicut increments. The body and bine of the shell was 8 9/16 long and veighed 6.75 list when annuabled. The length of the complete round (including the fin assembly) was 13.1° and the weight was 7.32 ib (See illustration on next page).

The shell was fired from morner in the conventimen but the functioning of the shell was different, as can be seen from the short description gives below.

The impact of the fune, or a sudden slowing up of the abell, resulted in the fiting of the fune primer. The final from the primer Ignited the Igniter charge in the top of the expulsion charge assembly (19) in the forward end of the shell, and caused the burning of the propullent within the capsule. This repeated the shell body and none by sheneing the set acrews (16) which caused the body portion to be thrown mount trute bounce along the ground. A slight dulay was passibly obtained by the pases from the expulsion charge (19) passing through the hole in the ighicion tube (18), then expanding in the cavity below. An additional delay was obtained by muone of the delay-deconator (12), the different elements in the delay-detenator being ignated in the under, of their agrangement. Explosion of the decounter

counsed (uncrimping of the booster pellet (11), which in turn caused the functioning of the burster charge of the

This type of shell was particularly convenient for use over note terrain such as awastplands. Uhere the shell would normally he buried prior so deconation, this design caused

the shell, after deflection to burst in the nir. The compositions of the explosive composition, as taken

from Ref 2, ape given below: A) Instition carridge primer: a) upper charge: Ca silicide 59.4, red lead 24.7 and Ba nitrate 15.9%, weight 0.023 g. b) lower charge: Be nitrate 47; Pb-atyphasse 33 and Ca silicide 20%; weight 0.034 g

B) Ignition carridge propellant: NC (N content 13.1%) 58.3, NG 39.0, centralite 0.8, graphite 0.8, total volatiles 1.0 and unaccounted 0.7%; weight 10.0 g; fquares about 0.0084" chick with langel of side 0,0374"

C) Projectile fune primer K chlorare 51, Sb trinulfide, 44 and Hg fulminus: 5%; weight 0.022 g

D) Projectile, expulsion : therge essembly: h) ignitor cup weighed 9.12 g and consisted of celluloid with N content 8.7%, b) ignicer weighed 0.050 g and consisted of K perchlarace 50, Pb thiocyanate 45 and NC 3%, c) black powder pellet weighed 0.17 g and consisted of K nitrare 77.5, charcoal 12.7 ned sulfur 9.8%, d) expulsion propellant capsule weighed 3.1 g and constant of celluloid with N content 8.7% (e) expelsion propellant, there weighed 13.5 g and consisted of NG (N connect 13.07) 93.9, convenies 2.6, graphics 1,02 cons) valuation 1.2, Spherylamics 0.3 and seaccounted 1.0% forme toods 0.0352" long and 0.0469"

E) Dulay-distanton-bostore unsembly: a) washer con-aloued of phasel-fensalbehyde impropuned jusper, b) delay-drespuner conscissed of (10 g inpore charges and leaf-Ay-allices 17.8 and bloder, of which there was 5.15 of 7.4° mage phenod designablehyde coordenation product and 2.45° of "B" sampe products; c) lower tharge consisted of 0.225 g of Ph chromase 50.2, K perchlarant 24.8, silicon 24.5 and hinder D.SN, d) disc separating delay from detonates connissed of 0.038 's NC 70 and NG 30%, c) decomposes committee of 0.35 g/oppor charge Pb aside...50, Pb styphones 30 PETN 10% and 0.23 g PETN so lower charge:

R) Bursting charge of the shell consinted of about 380 g of TNT or of 65/35 Amount (Am aicense 65; TNT 35%). G) A dioc (15) serving an a gas check and convining of 4.2 g Mg-styphletide, was placed at the bottom of the burnting Charge. References

1) LP. Vardlew, Pic Acon Tech Rept 1422 (1944)

2) E.F.Rosse et al, Pic Aran Chem Lab Rope 102 912 (1946).

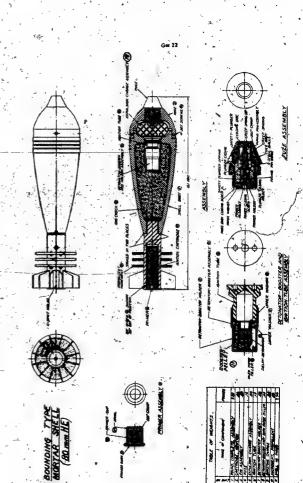
## B" Polver See Blättcheupulver,

Brandhambo, An inconding bomb countains white phosphorus either alone or in mixtures with highly combustible onserials. The following tyres are described in TM 9-1985-2 (1953). pp 54-7-

a) Bread COOA contained approx 30 lb of a cirtum consisting of phosphorus 4; bennine 86, and pure rubber 10% (p.54) b) Brand C50R, contained white phosphorus (p. 55) c) Brand 250A, Typen I and II contained the following mixture: principles B7.7, polystyrane 11.7 and phosphorus

(Sat also under Flammtomben, Incoming Bouts and Sprang

brunditioner (Self-Igniting Control) commented of a 2 x 2 rubber-impregnated cheese-cloth pillou case filled with capsules containing sisminus-chloromethyl minuse (Methyl



Scolj). A number of such cushions was placed on the ruwray of a junding linid. It was hoped that on landing the pressure of the wheels of the control of the control of the control of the world than ignize on connect with the air and descrey the the tires and specially the place, in practice the line was unsuccessful as ignizes on cannot with the six and descrey the the tires and specially the place, in practice the line was unsuccessful as ignizes was the property of the control of the property of which are usually carried them eachly beyond the

Leismace: CIOB Rept 25-18 (1945), p 23.

Brandstoffs and Brandbowken-See Microdiary Compositions and Incomings Business

Bruth (von Runch) in 1891-1892 paintened servent compositions existable for use an propollates in small serms, such and a) K chlomate 59-32 K blockesions 34-33, commands wax 5,95%, b) K chlomate 56-96, result 13.04% [Daniel, Direktons for (1992), 7-93

Brunntell und SV-Stuff. Sen SV-Stuff und Brunntuff.

Bennellader (Frierlen Type Ignicer). See under Ignicer

Branchendria, See Principarithel in the general section. Was used by German in one-linguistic of liquid propullants, analysis on university with Wirel 6 (viny terry jorden), unlike our, the back of many in it, such mainteners are given in G. Payleraich A.-G. Rayers, Archive 10 (10/20 g., Berlinden are University of the Section of University of the Communication of

Betome (Belomes). Sus in the general species.

Brishnencorr(Appearance for Mineraling Brisidens) See under Brisners Teste in the present section .

Adomação amentaçado es il, isemily Brinnece Place Shoesing). The plans see for brinnece was dyndered by ciploding a charge of single-size on the outside of a metallic plane (such as of lond, such, or characters). The extent of the duning produced was excepted With that caused by the mans veight of a sundand ciplosites, such as TNT. The town as briefly described in the paperal, accracia and also in A. Stouchacher, Spanage and Schiensoutte, Zigich (1948) pp 180-111.

Briensrose (B) (Brieness Value) is entertioned by the nested developed by East, as described in the greated section.

Briths Kapsel (Briths Demonster), According to Swothscher (Red 1), Briths Kapsel He Scommined is pinning than 0,30g of 46 mixe L A/L St. (compensed in 400-500 nm) mid-jie have change 0.07 g tweyl, companying at 2000-200 nm, Midwig (See 2) piron for British dynamics 0.32 g of L A/L St minner and 0.70 g of useyl. The Streamer care was indeed of a hisbanus because capper and brane nor attacked by References.

4) A.Sectherher, Schison and Spengandle, J.A.Bonk, Leipzig (1933) y 348

2) L.Midad,Min poul 33, 339 (1951).

Seriohanninder (Bridgo-wire Cap of Electric Biosting Cap), Varienc systems of Gornou electric cope using reusenace bridge-wire are described in Beyling-Dushopf, Speciagnosfer and Zindmittel, Springer, Berlin, (1996) pp 179-216.

Security (Grimly Bear). A nelf-propolied menor consisting of 150 mm howitzer or heavy infrastry gas on Pagple IV

(See also under Passer)

"B" Stahmine, See under Landminen and also on pp 276-7 of TM 9-1965-2 (1953),

the def (LE-Sed). A street consisting of hydranics bydens 27 and where 28, 5y, pt 1,012 or 20°. When suzed with 7-Sedf (hydrogen percuke) and E, cuproquasies as a cap styst. the liquid ignored appearance says. Since the least of constraints (Sedf was proposed (CIOS 30-13), pp 8 & 103. (See a lac C-Sedf, M-Sedf and T-Sedf).

"Buch" (Zänder). Chemical, crush-actusted type igniter. It is briefly described under Igniter.

Builet (Geschous oder Kupel), See Senii Arms Ammunizion.

Samble Box, See Human)

Burnting Charge (Sprengialiung, Sprengeroffguhalt, Sprengeram).
Table 55, given on pert two pages; HatsaGorman burnting charges described in Picationy Assenal TechRept 1555, pp 3-8.

"Busy Linnis". See under High Prenouse Pres-

apparently it was not adopted, he proportion were reported as follows: suble, less voletile than NG, calestific value. 1440 cal/g with H<sub>i</sub>O in liquid phase, it proved as he analys a medium good gelatifier for NG.

C-2. Same as Vencoriul (Vencoriul Guided Monile) [ TM 9-1985-2 (1993); op 219-23 ]

\*CA\*. A mixture dreeloped in Germany shring WEB so sense for the endedmant for TNT; hear-dain, 50, NeNO 153, and BDM 158, in density of fragments was 39, mCTNT 40 m). It was stuicable for loading shelts and house. [G.Rieser.]
PBL Rept. 85;160 (1946) p. 23].

Cabital (Cabersian). A type of blassing replexive such as: a) K aitmen 70, wood used 10, chargeal F and safer 12% (lef 1)7.3) K nineer 64.0, lamphick 7.0, safer 12.0 and wood palp 17.0% and iron sullawe addrs/779/filer? 27-20-sec explosives were nanufactured by the Duncelee Cabinist Warks A-G., Gasselwitz, (See also Wetternammenhiple: uselee Venningroupporties)

References:
1) Ulimens, Enzyklopidio, v 4 (1929), p700
2) Thorpe 's Dictionary, v 4 (1940), p 463.

Coleint-(Calcinite). A type of mining explosive cont large ensents of sechnical valcular nierate [Ca(HO<sub>2</sub>)<sub>2</sub>, 4H<sub>2</sub>O<sub>3</sub>], such large

S. Colehire I. NG 15-20, Ca nitrater 32-36, Am nitrate 52-34, word meal 13-17, liquid hydrocarbon (with Hash point not lower than 30°) 0-25 (Ref 2);

Calciuly 2. NG 15-20, Ca airmae 60-70, Am nitrace :0-15, charcoal and/or vegetable ment 6-14, liquid hydrocarbon (with flash point not lean than 30°10-8% (Ref 2)

Morehall (Ref. 1) given for a Calcinine: NG 20, Ca ultrane 266 and charceal 14%. Spickland (Ref. 3) given for Calcinist 1 moneyactured at the Krüment Fachilt at D. A. of the following composition: NGC (aimsgipcal) 6.0, DNT 4.8, TNT.7.2, Ca aimste (vice) 36.0, Am aimse 35.5, wood mind 8.0, capuer motetum dyn (Fe. O.) 0.59.

References:
1) Marchall, Englandves, v 3 (1932), p 109
2) Beyling-Trebogl, Specaganette (1916), p 99
3) Scickland, PB Rept 925 (1945), p 69.

Ger 2

Chirgo	Unco
TNT (pressed)	37 mm HE shell with PETN as a deconator base charge,
	40 mm HE shell with 40/60-tetryl/pressed TNT booster
	47 mm AP shell with 85/15-PETN/pressed TNT booster and 150 mm HoC (shaped charge) rocker
THT (cast)	37 mm HE shell with PETN/wax booster,
	47 mm AP or HE shells with pressed TNT boosters and
1 -	50 mm HE shell with PETN/wax booster;
,	50 mm Trench Morter shell with 92/8-PETN/wax beneter, 75 mm AP and HE shells with PETN/wax boosters;
	76.2 mm AP shell with PETN/wax booster; Used in captured
	76.2 mm HE shell with tetryl booster   Russian mms
	50 mm HE shell with PETN/wax or present INT booster,
1	36 mm HE shell and 105 mm AP shell and 105 mm HE shell with pressed P A or PETN/way booncers:
	105 mm How shell with 92/8-PETN/wax houster,
	150 mm HE shell with PETN/wax booster,
	150-mm and 210 mm A/C shalls with PETN/wax because,
the second second	170 mm and 203 mm HE shells with PETN/wat boosters, 210 mm A/C and HE shells with PETN/was boosters and
	240 mm and 280 mm HE shells with PETN/wag boosters ;
	500 kg and 1000 kg AP bombs;
	1 kg, 2 kg, 10 kg, 250 kg and 500 kg Frag bombe and
4 (4	10 kg, 50 kg, 250 kg, 500 kg, 1000 kg and 1800 kg GP benths; 50 kg HE inc bomb, Butterfly bomb and 50 kg A/C bomb;
10 mg	50 mm, 80 mm and 105 mm Moring shelle:
	27.5 lb and 110 lb Demotition charges, Egg and Stick head
* 4.39 ct 17.5	gresades, Panzerwirimine, A/P and A/T mines, and A/T
85/15-3WZ/wes	and HoC rifle grenades 500 kg Freg bomb
THT with 5-10% was	36 am AP shell with 92/8-PETN/wax booter, 47 am HE
	shell and 150 mm A/C shell with P A become, 900 kg, 1000
	kg and 1400 kg bonds
94/10-TNT/Al ** Picric ocid (peopod) **	250 kg GP bomb and 75 mm HE Inc shell 75 mm HE shell with PETN/wax boospar
EDDN (Ethylosodiamiae dinierate)	105 mm AP shell with RDX/wax mouster.
RDX (Henogen)	42 nm HE shell
00/12-PETH/was	20 mm AP and HE shells with PETN detonator base charges, 28/20 mm HE shell and A/T side granade
\$2/18-PETH/ves	37 mm AP shell
87/13-PETM/ves	50 mm AP shell with PETN/wax booster
95/15-PETH/was	20 mm HE shell and 37 mm AP shell
90/10-PETM/was	27 mm and 37 mm HE shells with PETN deconnect inner charges and 40 mm HE shell with 40/60-ceryl/presend TNT
	pocate.
91,5/8.5-PETN/wat	20 mm HE shell, 50 mm AP shell, 80 mm Chem Morme ahell
PETN/was/Al	20 == HE Inc shell
> 90/10-RDX/wax	75 mm AP shell with 94/6-PETN/wax detonator base-pharge and: 88 mm AP shell with RDX or 96,5/3,5-RDX/wax detonator
1	base charge
94/6-RDX/wex	75 mm HoC shell with 90/10-PETN/wax boceter
EDDN/RDX	105 mm AP shell with RDX/wax booster
33/3/64-RDX/wax/Za / 75/1/19/5-RDX/wax/poud Al/celid Al-	20 mm HE Inc shell with PETN detonator base charge 27 mm HE Inc shell with PETN detonator base charge
cing puller	HE ISE SEEL WITH PERIOD COMMENTS
10/70-PETN/TNT (pressed)	37 mm AP shell with PETN detonator base charge
30/70-PETN/INT (cast)	37 mm AP shell
61/35.5/2.5-RDX/TNT/wax (pressed) 57.5/40/2.3-RDX/TNT/wax	37 mm HoC shell with 90/10-PETN/wax booset 75 mm HoC shell with 89/11-PETN/wax boosets
57/40/2.5-KDX/TNT/was: 57/40/3-RDX/TNT/was:	105 mm HoC shell with PETN/was booster
51/4 V1-RDX/TNT/was	75 mm HE shell
48.5/48.5/5-RDX/TNT/wax TNT/KCI/wax	150 mm HoC shell with 90/10-PETN/was booster
THT/KCI/WAX	210 mm A/C shell with P A booster
76/4/20-RDX/wax/Al with MOs nees	1800 kg AP bomb
/	

75 mm HE shell with PETN/wax booster; 76.2 mm HE, 80 mm, 40/50-Ametra 88 mm, 105 mm, 120 mm, 128 mm, 150 mm and 210 mm shells; 210 mg and 300 mm Rockets; Panzerfaunt with 90/10-PETN/wax boosws 75 cm HE shell with 94/6-PETH/wan booster; 80 cm morns shell 35/65-Ametol end land mine 200 mm Morter shell with PETN/was booster 65/3"-Ameto 25 mm HE shell with 89/11-PE IN/wax hooster 30/ 0-Amorol 88 mm HE shell with 87/13-PETN/war booster and 500 kg AP 60/40-Amerel bomb: 1 kg, 2 kg, 50 kg and 500 kg Feeg bombs; 50 kg, 250 kg, 1600 ks. 1700 ks. 1800 kg and 2000 kg GP-bombs 50 kg, 250 kg and 500 kg GP honie; A/T mine, had mine, wood 40/40-Ameri land mine and 80 mm Morter shall Land mine 45/55-Amerol Esa hand greende, rifle greende 80/20-Amerol 1400 kg and 1800 kg AP bombs; 250 kg; 506 kg, 1600 kg, 1200 kg. Triales (15/70/15 RDX/TNT/At) 1800 ke and 2500 kg GP lombs 10 ks A/C homb, 250 ks GP bomb 90/5/2,5/2,5/-NHTNO\_/C,\_h\_/wood 70 kg Frag bomb and 250 kg GP bomb 33/50/15-NH\_NO\_/DNB/RDX 500 kg Frey bonh, 50 kg GP benh, 250 kg GP benh mil 33/50/13-NII,NO /DNB/RDX, with son filling of 53/30/17-NH, NO /Cs sitestay 1000 kg Parachase boni-RDX/Comp B2 70/20/10-NH,NO,/THT/AI PAE 44 bomb with 90/10-PETN / was be 55:5 kg Deholition charge, Persecualmins, biogratic grands and rifle spanels SO/SO-RDX/THT Pennerfount with PETH/was become 60/40-RDX/TNT 69/17/11/5-NE/NG/wax/Mg sale Louis minus

Abbreviatione: AA Antinireraft: A/C Austroprieus: AF Armor-plereing: A/P antiperconnel: A/T Antinek. GP Givarni parpone; Mi High-explosive; NoC Hallow charge; New Howitzer; MGo Nitroguanidise; P A Picric acid; PETM Pennscrythrical strumitmen; her inconducy; Comp Composition; From Fragmanusium, News; Accepting to M. Gian et al., Dinjunacio d Chimica UT-ET, Torino, v2 (1947), p 166 now G penados were filled with a missare of black proder \$3. K perchloraes 18 and Al (powder) 5%.

Ritie greader

See mines

Calciumbarhenet (Calcium Carbenner), See gracent section. Calciumnitret (Calcium Nierner), See general section, to Nices and

Coletaneiliuid (Calcina Silinide). See general nection.

Colorific Value of a propellant was determined by firing a charge of 1.7 g in colorisation was of 12 or tangenty, and 12 or tangenty, piece of succellosized gas-coron. The values obtained by this method were higher than those obtained by reliculoisations. Even the success of the value of the section of the value of the section of the value o

## Connen See Kraces and under Verpens

Hermite/INT/Al

Curboutt (Carbonite). A'type of paznisaible explosive which may be considered as a attained dynamics with the temperatures of explosion lowered by the excess of carbon it comtains. As a class, carbonies merge through the armoscarbonites with the amnonium nitrate class of explosives.

The first carbonite appeared in 1885 (Bichel and Schmidt inventors) and nince then the carbonites have been medified several times. The composition which passed the Voolwick Test in England contained, according to Magshall (Ref. 1): NG 16, K and Ba sittere 33, wood meal 40.5, sulfuremed beaness 0,25, Co, and No curboness 0,25%. The communicies of few German carb

WW I given in Table 6 were described by Novum (Ref 2) and Davis (Ref 3).

(See Table 6 on next page).

(See also Kohlen-Carbonis under Robies-Sores Exxen-Carbonic). References:

1) Marchall, 1 (1917) pp 375 & 492 2) Novim, Histoglyceria, Raleimore (1928), pp 403-2 '33 Davis (1943) pp 352-353.

Corridge (Porrose in fixed association; Karvasche in overliged association); Corridge Cose (Parcentaheline; Kartuschever) of covervational design and draws richer from sheet brass (Ca '72, Za 28%) or from sheet steed, copper-auton on boch sides (Ref 1, 5 57). German sngittery carefulge cases of pre-WII were made of lexas but since 1942 the essentity of cases were made of aberts week, copper-pixed as both of cases were made of aberts week, copper-pixed as the contract of cases were made of aberts week, copper-pixed as both niles. Liter in the war she no-called supped stool castrodges. Were produced. Castridge, cases were employed in all German artillery ammunition (fixed and semi-typed) and these was no ammunicion corresponding to the American "separate loading". The case was chaefly employed to residere the breech block and to send the gases generated by the pro-pullant. Although in fixed namunicion the cravidge cases served the purpose of protecting the grounding charge has many of the semi-fixed rounds the propellent charge was

Conteniose										
Composition (%) and properties	Carbonit	Carbonie 1	Carbonit II	Carbonit Extra						
NG	25.0	25.0 -	30.0	35.0						
Colledies comm			1 . 1	0.3						
K nitrate	30.5	2.4	. 9	25.5						
Na nimete	-	30.5	24.5							
Be nitrate	4.0		-	. 4						
Spent ton back	4.0 40.0									
Moni	- 4	39.5	40.5	34.7 (ma meal) ·						
K bichronner		5.0	5.0							
Na carbonais :	0.5		- 1	0.5						
Density	-	•	1.10 -	1,20						
Heat of Explosion, heat/ke	· 576	536	, 60s	•						
Temperature of Ex-	1874	, 1666	1639							
Valority of Domes .	2463	3042	3850	070						
Tinhal Test (10g	235 cc	240 ec	250 ec							

larger than the contrider case and therefore the case did not give complete posterries to the charge (Ref 2).

The following exettings, both Genna and compand from compared committee, are briefly described in Ref 3;

A. Fined Artillary Assessition include:

al 20 mm blouder and Oscillant used on various 2 cm يبجع عبلتهم بمبعد فثقة معير b) '90 cong wood' in 5 cm Sei

c) 37 mm; mood in 5.7 cm Puls, 3.7 cm Flok, 5.7 C/30 (Haval) and 3.7 cm Polish Pak gues d) 40 mm; used in 4.0 cm Flak 28

e) 47 mer med in 4.7 cm Carch and 4.7 nm America Bibler pose

() 50 mm; weed in 1 cm Pak and 5 cm KuE 35 cms a) 75 mm; used in various 7.5 cm pune

b) 76.2 mm; used in captured Russian 7.62 cm man i) 76.5 mm; word in 7.65 cm captured Asstrian, Cauch and Yunneley Stee

i) 86 mm; nord in 8.8 cm Fink 18, Fink 36, Fink 37 and Finh 41 as well as various 8,8 cm Pak pane.

h) 100 mm; word in 10 cm K 17, and K 18 ..... various 10 cm LFM

B. Saniffmed Assessables includes: a) 75 cm; used in 7.5 cm FE and 7.5 cm FH

b) 105 mm; used in 10 cm X17, X18 and various FM

c) 122 mm; used in some 12.2 cm-captured Russian pa

d) 128 met used in 12.5 cm Flak 40 and Pak 44 mas

a) 150 mm; used in 15 cm K18, X39, aFH15, aFH 18 am other weapons

f) 152 mm: used in 15,2 cm captured Russian mas a) 155 mm; word in 15.5 cm captured French and Polisi

h) 170 mm; used in 17cm Kilder Laf

i) 194 mm; used 19.4 cm French Railway Gua i) 203 mm; seed in 20 cm K(E)

t) 210 mm; used in 21 cm Mrs 18 and lables 18

1) 240 mm; used in 24 cm Th Bck(E) and Carch ok u) 280 mm; used in X5(E) and other gass

m) 355 mm; need in 45.5 cm HM C. Small Arms Antonoxistan includes

a) 6:35 mm pintol carridges b) 7.65 mm piacel carridges

c) 7.92 ma ciffe and machine are cortridate

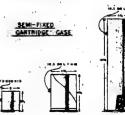
d) 9 mm machine gun carridges a) 15 mm Solothurn cartridge

() 15 mm Minner consider

Sonn Some of the 13 mm and 15 mm am times been cossidered as artillery ammunities

Besignational C Construction (Pattern); (E) Einenbahn (Ralland); F Feld (Field); FM Feldhaubites (Field Howines) PK Foldtoome (Firld Cannon): Fish Assistreraft; H Haubitan (Howisser): K Kanene (Cangon); K(E) Kanene Einstein-(Railwood Gon): Kildrel of Kanone ins Mirner Lafette (Gun ld Morner Mounting); KK Ensemnttenkanene (Canemate Gan); KwK Kampiwagenlianose (Tank Gun); I leicht (light); ig long (long); IPM light Field Howitzer; letter Long Morter; is black at Model; Military (Morter); Pult Antitank; a soliter (heavy); all Heavy Gun; Thilleli(E) Thendor Brists Kissons. Eigenhahn (Thouder Brune Gun, Railread),

(See also Ammenition, Bullet, Grante, Small Ates Ame picies and Smel Ammunition). (References are given on the next page).





A. J.Dess. Onfmance Sergense. Doc 1943, pp 357-61.
 E. Englezburg. Ordennoc Sergense. Nov. 1944, pp 321-2
 Anon. Technical Menusi. TM 9-1963-3 (1953), pp 340-44.

Corridue Con Consectitions examined at Picationy Amenal and listed in the Pic Area Tech Rept 1555 (1945) p 30 are as follows:

a) M F 52, K chlomer 23, Sb trisulfide 20, abraeive 5% b) MF 25, K Chiorage 37, 5h trisulfide 30, alone 85,

Corridor Cose Potenssion Primer (Low Emplasive Train or Propellus Train)(Cladentreseasts). The compositions in Table 7 were taken from Ficatings (Arsenal Technical Report 1555, p 15.

Corridge Coxes, Steel (Patroscabillae Scahl), Day to the shorings of copper many types of Germes carridge cases were made of steel. Brief descriptions of their methods of manufacture are given in the following GloS Reports: 26-74, 27-36, 31-53 and 31-54. Concede Flore Bomb (Bark 50 Enskade) in briefly described under Pyroschaic Assi-Pathilader Devices.

Collude: (Colludia or Comphessal). See Pinatel

Controlle (Contralice) is a type of organic designative of No N'-diphenylures developed beginning in 1906 at the Centralstelle für wissenschaftlich-technische Untersuchungei au Neubabelaberg. Following are compounds suitable for use an arabilizers: Control 1 (Mollie I) (Ethyl centrolite), N,N'-Diethyl

N.N'- diphenyl-ures. Control of El. (Mollit II) (Mothyl control to 1 N.N'-Dimethyl-

N.N'-diphapyl-urea Controlly III (Methylethyl centralite) N-Methyl-Maethyl-N,N'-diphenyl-uses All three contraints are described in the general sec-

tion. The first two compounds were used in Germany and other countries primarily as stabilizers for propellence. When used in amounts exceeding the requirements for a stabilizer (auch as above, about 1%), centralizes act alsoan gelatinizers for NC and probably, at least in part, an Clash reducers (See also under Propellance). References: 1) A.Stettbacher Schiege und Sprengetoffe, Barth, Lainnin

(1933), p 197 2) Kase-Metz, Chemische Untersuchung, Viewag, Braus schweig (1944), p 165.

Certridge Cose Personales Primer Consentitions Composition % ... Loca 48/12-Ba nitrato/L St. 7.97/13 mm HF shall 35/37.5/21.5/6.9-KCIO\_/ 20 ma AP Inert Char shell 20 mm HE shell, 50 mm AP Sb. S./M F /abmaive AP HV shell, 58 mm HP and Mech time fuse shelf 43/24/24/9 KCIO /Sb, S./ 37 ma AP and MR shalls and 105 mm HE Howitzer shell M F / abcasive 30/24/35/11-N F /KCIO\_/ 37 mm HE shell . Sb\_S\_/glass 28/31/26/15-KCIO / 47 mm AP.AP HV and Sb S /h F-/abracive HB shalls 50 mm AP.AP HV and 89/11-L St /NC locates HE shells and 75 me AP and HE shelle 28/34/32/6-M F /ECIO / 40 mm HE shell Sb\_S\_/ glass 22/40/38-M F /KCIG /Sb S 76:2 mm AP shell

Abbreviettenes AP Amor-plercings HE High-explosive HV Hyper volgante: C A Lend anide; L St Lund styphaste; M F. Murcuric fulminate; MC Nitrocollulous; Chge charge; Mesh Mechanical-(See also Primers).

Ph tri crace/NC/charcoal/KNO 1:50 mm and 210 mm Rockets

(Wastermanne)

Central stelle für see. See Zentralseelle für wiesensch-nich Untersuchungen. Contribugel Cauting of Gun Barrols in clos Repris: 29-39 and 31-46.

Chaddie (Cheddier). Chlorice and perchlorice explosives invented in Pitrace but also used in Germany and other countries (see under French Explosives and in the general

Chemical Werfers (Chemischer King, Gaskampf, Gaskreg) and Chanteed Werfers Anost (Chemischer Kampfrech). Although the Germann did not use any of the poison gases must be compared to the comp

were filled with toxic mixtures, based on DM (Adamaits). were filled with toxic mixtures, based on DM (Adamstre), me for instance: DM-43-2, Am prachlorate 2.8-5, and urea ream syrup 28.3%, This mixture was initially liquid but beccame solid 2 houre after being prepared. Another mixture landers as A Poliver consisted of DM, NC and diphenylamine in various proportions. Several other mixtures, such an APM 30, APM 49 and O 192 are mentioned by Bateman. but the compositions are not given,

Cheminche Beständigkeitsereben (Chemical Stability Tests). Various nests used for explosives and propellants are described in the book of Kast-Merx, Chemische Unterschung, der Speeng und Zünderoffe, Vieweg, Braunschweig (1944) and also in the general section.

Chambacher Zinder "Ruck", | See Chambal Jeniser union

Chamlach-machanischer Zönder. See Chemical-Mechanical Igniser under Igniser.

Chomiech-Technische Reichsmatelt (CTR), verneis Militärven sychomic Government Chemical-Technical Institution, former ly Office of Military Research). A scientific institution located in Berlin and devoted to problems of the Atmed Forces (Vehrmacht), its work included research on amoumition, explosives, liquid fuel, military equipment etc. The Reichnements, before WW 3, published the journal called Jahresbericht der Chemisch-technischen Reichans-Reference: Dr H.W.Adam, Pientings Aragani: Private com-

munication (1954). Chlorete Emiesives.Sec Chlomasorenes mifel-

Chlorate (Chlorater)- A type of chlorate, blasting explosive, such as listed in the Table #

Components and some properties Chloratit I Chloratit 2 Chloratit 3 No chlorate and /or 70-72 73-75 83-91

1-2 Vegetable meal 1-2 0-4 THE and DAT 18-20 18-20 Paraffin 3-4 3-4 Nitroglycetin 3-4 Liquid hydrocarbons ( flash point not less than 30°) Orygen Balance +3.0% +1.9% Lead Block Expensio 290 cc 280-cc Lead Block Crushins 20 mm 19.5 mm Sensitivity to Initia-No 5 Cap No I Cap tion (requires at leagt) Gap Test (using 25 me S cm 8 cm cartridaes). Velocity of Deton 4100m/ee 1000 m / nm Density of Charge 1.57. 1.46 1250 cal/g 1289 cal/s Heat of Explosion 3645° 3700° Temperature of Explosion -

Note: One of the chloratites I was called Gesteins-Koronit I I, one of the chloratites 2-was called Gesteins-Koronit I & and one of the chloratites 3 was called Miedxiankit. References:

1) P. Naodin, Schiess- und Sprengstoffe (1927), p. 151 2) Marshall, Classes, 112 3) A. Stettbacher (1933), p. 314 4) Beyling-Pickopf (1936), p. 97 5) F. Weitchelt, Handbuch der gewerthlichen Sprengtechnik, C. Margold, Helle/Sante (1933), p. 33.

Chlorate Explosives), Mixtures, based on 'chlorates, such as Chloratit, Gesteins-Albit, Gesteins-Koronit and Miedziankir. The chlorate explosives were invented in France and

used under the name of Cheddites ... References .

1) R.Escales, Chloratsprengazoffe, Veit, Leipzig (1910) 2) P.Naquim, Schiens und Sprengrioffe, Steinkopf, Drenden (1927), pp.124-132

3) A. Stenbacher, Schiess- und Sprengeroffe, Barth, Leinzie (1933), pp 309-515 () C. Beyling-K. Drekopf, Sprengstoffe und Zundmittel

Springer, Berlin (1936), p 96 5) A.Stettbacher, Spreng- und Schienstoffe, Rancher, Zürich

(1948). pp 90-1.

Chlorobromomethene. See Feuerlösebaites! CB.

Chrom-Ammonit (Chrome-ammonite). A type of coal mining explosive used before WW It a) Am nitrate 70.0. If nitrate 10.0. TNT 12.5, vegetime, or paraffin 0.5, chrome-alum 7.0%; b) Am nitrate 63.25. K nitrate 17.5, collodies cotton 9.25, vaneline or paraffia 0.5, chrome-aims 9.5%. [See Thorpe's Dictionary, v 4 (1940), p 354]

Chromat Plotting of the Barrola. Experiments on the placing of tubes up to Me'ma ciliber were conducted dwing WW II the thing Crabb. Engair (Westland). The thickness of platin brong Crabb. Engair (Westland). The thickness of platin brong Crabb. Engair (Westland). No information is available as to outcome of the superiments CIOS 32-64).

Classed Cycle Dissel. See under U-Boat Water. Closed Vessel Testing According to CIOS 31-68, pp 12-16,

closed wessels were used for the following perpenses:

a) The development of any propellars

b) Sendies of perticular properties of propillars

C) Obtaining data for ballistic calculations!

"Tests designed for the first two purposes were carried out mainly at the Dimetry factory of Drasani A.-G, while those for the "A"-dp purpose were made at the Exest Sactory of Krupp. A certain amount of closed vessel testing of sundams propellants was done in the DWM (Deutsche Waffen and Munitionsfabriken) research laboratory at Libech.

Cald Rithwalen Precess (Kelleprizes) (Ritrally cold-squiring) as used during WY. If by the Germans in the in the following PB Report prepared in the period 1945-1948 by the Heints Manufacturing Co. Philadelphia Pen-sylvania: Nos. 39371, 96704 and 967046 Case also Col-Extrusion in the general section).

Calered Smeke (Buntrauch). The bulk of the work on the development of dyes suitable for use in colored smokes was done by the IG Farbenndustris. The pamplet "IGF" of the Office of Technical Services gives a list of these dyes. The following references describe some German colored

amokes and smoke signals;

1) W.T. Anasovich & E.C. Stawick, "Gelman Smoke Signals", PB Rept 49467 (1944)
2) H. Eppig, "Chemical Composition of German Pyro-PB Kept 4940 (12744).

2) H.J.Eppig, "Chemical Composition of German Pyrotechnic Smoke Signals", PB Rept 16728 (1945).

3) J.Kanegis, "Colored Smokes", PB Rept 102,500 (1951) (Included are several tables of colored amoke compositions.

and some references)
(See also Colored Smokes in the general section).

(Industrial or Mining) Emplosives . (Goverbilchespringatoife oder Zielfsprengetelfe) Predering WW S: The lirst application of explosives (black powder) is mining was made, according to Beyling and Drekopf, in 1627 when an Austrian, Canpar Westell blasted some orant Observation Biberstollen in Hungary, The next mine blanting was done in" 1632 near Claustahl, and then in-1045 near Freiburg. Germany. The first bleating in England spok place in 1670. From that time on the blanting of cost and oren, spread to other countries. Black powders of various compositions ware used exclusively until above 1865 when A Nobel introsuced NG dynamites (See under Swedish Explosives). Appear the compercial explanates send in Germany prior

to WW II. the following may be listed: Ammond, Ammon chlorett, Ammongelatine, Ammonit, Bikarbit, Calcinit, Cheddie, Chloratit, Detonit, Donarit, Dynamit, Milotit, Genering-Albir, Generina-Koronie, Goorvina Persolie, Gule dynamit, Loonit, Mied zinnkit, Vorrerderenit, Venterlignonit Werrernobulle, Doctornalit, Verterwangit, Verterwentfalit, These explosives are described briefly in this (German)

poetion of the book promines to their alphabetical order. Some of the rypical explosives used during W. E are given in Table 9 under Commercial Explosives of VY L. "It is interesting to note that some of the consecutal explosives used before WW & were manufactured from surplus milimry supposives and propellants. Aming these explaniest were: Energie, Nitroglyceria Powders No 1 and No 2, Pibris (or Silvis), Pyrelis No 1 and No 2 and Triwestfulit. Bafarearen:

1). PiNacon, Nuroniveeria and Nicroelyceria Explosives (tribulated from the Gorman by F.M.Symmes), Williams & Wilhias. Baltimere- (1926)

2) A.Stotthuchet, Schloop- and Sprongovoffe, . J.A.Barth, Leinsig (1933)

3) C.Beviles & X.Denterf, Springswoffe and Zhodnittel. 1.Sozianer, Berlin (1936) 4) A Scottbacher, Spring and Schieseauffe, Reacher, Zürich,

COMMERCIAL (INDUSTRIAL OR MINING) EXPLOSIVES. (GEWERBLICHESPRENGSTOFFE) OF WW M. Among the German, industrial (mining) explosions, the more important were dynamics-type ouplesives commissing various' amounts of a product obtained by sinuring a mixture of glyceria and glycol (usually 60/40). The nimerics of glyceria and glycul is described briefly under Nitroglyceria.

There were generally two types of mining emplosives the relatinized type (such as some domarites) and the powder type (such as calcinies and some descrime).

Following in a short description of their methods of

A) Galaria 1796 puploaives -Procedure

(IGARL

of A weighed amount of collection curron (previous): dried at 50-60" in a rack dryer to a mainture content of shout 1% and then cooled) was introduced into a knowling pan which contained the required amount of liquid DNT, or other liquid airrocompound, maintained at a temperature of 15-20. The mans was attired all the while with a long handled wooden spatule. The kneeding can was a fint vessel made of copper place with an oute q jackes of aluminum for warm water beating. This on

eration was followed by addition of a weighed as of NG-hitrorlycol mixture, while continuing me hand seirring. The resulting gelatin was allowed to stand for 1 hope.

oce: For Am sitrace-type explosives, the planticity was perimes controlled by adding a solution of "geloes". b) The pan was removed to another building where it was placed under the outlet funnel of a sieve through of which the usual solid components of dynamites (such as An or Na nicross, TNT, wood neal, Wei, etc.) were fed. These components were previously pulverized and dry blended in another building. Thile the addition of the solid ingredience took place, the man in the pan was stiered by means of a planetary stiering machanism, which could be lowered or raised as desired. Kanading sime man namelly about 20 minutes.

Note: Several types of mixten (blenders), were used, such as the Desiswercke, Versig, McRoberts and a modified Verner-Pfleiderer

c) The thoroughly kneeded many of palatin and of solid components was removed by a wooden hand specule into wooden transport boxes to be carried to the carridging

Note: German permissible explosives were usually white in color, while the non-permissible were colored red by the addition of caput moreum (Fe O ) in the mining stage,
d) Cartridging was done either by fully automatic machines (such us the system of Niepmann & Co , Gavelaburg) or by seni-automatic machines (such as the system of Bransing). The Brensing machine (made sectively of beans) consisted of a-conicel casing through which passed a harizontal fording sciew. The gelatinized many was introduced into the muchine by hand through the filling funcil. A paper carridge true placed at the narrow and of the conical casing, After a carridge was filled, it was removed by hand and the open and crimped. The diameter of a carridge was 22, 25 to 30 mm. After packing these curvidges into a box (36, 25' and 20 contriduce per box, respectively), the box was mapped in paper and dipped in paraffin. For shipping, 10 bonns and were packed in a case. a) Permissible explosives were mechanically sheathed

with an "active sheath" consisting of NG 12, NaCl 33, and NaHCO' 55%. Originally, the composition of the sheath was NG 15, NaCl 35, NaHCO 50%. The sheath weighed 55 g and the carridge itself 70 g.

B) Pawder type empleatives: To this type belong explosives which contained amalf amounts of NG | such as 4%1, no collection cotton 'and were pulverulent, The mining of the components was done in a tiltable type Verner-Pfleiderer blender which consisted of a brass trough provided with two horizontal brass stirring college tunning in opposite directions.

a) The weighed amounts of the solid compositets (such as Am, Ca or Ne sitrates, TNT, wood ment dye esc, were mixed in a Werner-Pfleiderer blender then the liquid DNT, NG, NGc etc , were added. kneaded for 15 minutes

b) The kneader was then tilted and it charged into wooden casks to be taken to place.

Note: In the case of explosives such as Calcimit I mans could be immediately carridged, but with Donneit ! the mass had to be left overnishe in storage deform care

Cartridging was usually done by fully

machines of the Niepmann type, Dismeter of carridges for Calcinit I was 28 mm, while for Donarit I it was 30 mm. The finished carridges of Donarie I were dipped in perallin and packed in boxes (25 per box). The careridges of Calcinit I were not paraffined but were packed

directly in boxes (32 per box) and then the boxes dipped in paraffin. Table 9 gives some typical German Commercial Ex ploaives manufactured, before and during WW E.

		. 7		3 0 004	-,					
nad nome properties	Ammonis - 1 (1932)	Donneit	Dynamit	Gelatine -Donarit I (1936)	Wetter '-Donatit A (1936)	Wetter -Nobelit ≡ (1932)	Wetter -Nobelit B = (1932)		tter sgit B	Wetter -Westfalit A (Permissible)
NG(Nitrogly 6 - ,	A.0 .	4.0	63.0		6.0	25.4	29.2	30.0	27.8	4.0
NGc (Nitro-		3.5	-1	22.0		-				
MC(Nitrocer		. 27	20	0.8	n .	. 0.6	0.8	1.0	0.7	
Inlose) TNT(Trinitro-	* 6.0	12.0		5.0	2.0		2" -		. ,	0.5
DNT(Diniuro-	6.0	2.0		6.0		2.0				0.5
Am nimme	80.2	79.8	1	35.0	72.0	32.0	26,5	29.5	30.5	80.5
Na nitrate Vood meal	3.5	2.0	26.7	10.0	2.0	1.0	0,5		0.3	1,5
Rock sak(NaCl) Caput mortum	0.3	0.2	0.1	0.2	18.0	36.5	40.0	39.0	39.5	13.0
(Fe <sub>2</sub> 0 <sub>3</sub> ) Gelose (Carra-		2.	1/3		9		5 4	0.5	0.7	- 25 4 5 3450
gan moss) Talc		<i>i</i> 2.	×	2.0			- C.		0.3	
*50% Ca nitrate solution	4.5	2.5	1	\$ 5m		2,5	3.0	-		
Trauzi Test, cc	3,70,0 17,5	1."	385.0	380.0 20.0	220.0 10.5	6.5 1	185.0 14.5		wh.	
Compression, mm	4800(as		6350	6150	3000(at	5750				
m/sec.	d=t_12)	7.	,		_ds (,10)		\$650			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Cartridge Den-	1.07	\$ 24	1.53	1,53	1.06	1.66	1.69	-	7	NOTE: 1
Gap Test, on Charge Limit,	6.0	2. 1	10:0	10.0	600	700	700	1	: .	
Oxygen Balance,% Heat of Explo-	+0.06 996.0	: 7	+3.0	+5.68 1029	+10.4 516	+4-08 642.0	+6.15 568.0	1	÷	"
sion, kcal/kg Gas Volume, l/kg	904.0		603.0	806.0	172.0	536.0	500-0	1.	2	٠ سو

Note: The composition of sheaths used with some of these explosives are given under Active Sheath. . .

P8 Rept 925 (1945), p 69
2) R. Askeberger, ut al. Envestigation of German Commercial

Complete Round of Artillery Ammunition. See under Granace

Composition A (Comp A) A mixture of RDX 90-97 and Montar wax 10-1%, similar in properties to Comp A used in the USA during WV I and described in the general section. Getman uses of Como A were in boosters, sub-boosters and as a filler in some grenades and shaped charges.

(See also Filler No 86, No 91-and No 92). Reference: Allied and Enemy Explosives, Aberdeen Provins Ground, Md, (1946), p 122...

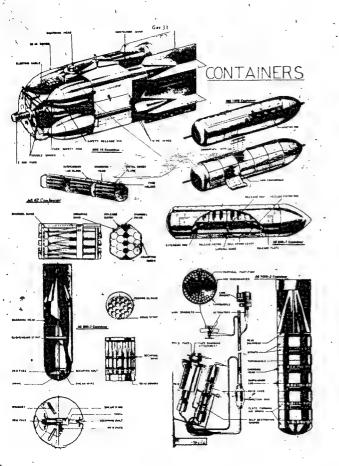
Composition B (Comp B) (Cyclotol) A mixture of RDX and TNT in various proportions similar to Comp B described in the general acction. Some of the compositions contained small amounts of wax. Comp B was used by Germans, during WW I for filling shaped charge shells, grenades, rockets, and some demolition charges. Pellets of Comp B embedded in TNT were used in 4000 ke bombs. (See also Filler No 18 and Filler No 95), .

23) R.Ashezok, et ål, Investigation of German Commerci Explosives. PB Rept 63,877 (1946), pp A 1/8 and A 1/11.

Explosives, BIOS Final Rept 833, ftem 2

Reference: Allied and Enemy Explosives (1946), p 124.

Composition C. A plantic explosive similar in properties



to Comp C described in the general section and the Pitt used by the British during WWI. The German version is described here as "Plants"

Reference: Allied and Enemy Explosives (1946), p 127.

Concrete Boll Mine. See p 276 of TM 9-1985-2 (1953) and ...

Connecting (or Intermediate) Composition. See under Gaziess Deconators (Electro).

Containers Corried by Planes, German containers may be subdivided into (1) those intended to carry their contents safely to earth and (2) those designed to scatter their contents before impact.

The first type served to deliver supplies to specific locations and generally consisted of a compartment to house the supplies and a parachute to bring the container safely to eath. No explosive opening davices were incorporated.

The accord type could be subdavided into dopable and—nonfopable (retained in the aircraft) containers and also according to content into bomb-consistent, flare container or combination bomb-flare constance.

Dropable containers were fitted with fusing and opening devices intended to release the missiles us from predetermined.

devices intended to release the missiles after a predictermined time of fall from the aircraft. Some of these were open devices which held a cluster of bombs or flares by means of accuring bands, whereas others were closed containers in the shape of a bomb.

"Nandeophib. accurations were, intended, to be used re-

peacedly and they were constructed to carry and scatter a great number of small incendiary bombs. Their release mechanism permitted desired spacing of the bombs in flight These containers could be jettigoned if necessary.

These containers could be jettiaoned if necessary.

The following bomb and flare containers are described in TM 9-1985-2 (1953), pp 93-120:

11 BDE 10 Cluster Container carried five SC 10 or

1) BDE 10 Cluster Container carried five SC 10 or SD 10A bomba (pp 93-5) 2) AB 23 SD 2 Container carried 23 SD 2 bomba (pp 95-7)

2) hB 23 50. 2 Container carried 22 50 2 bombs (pp 95-7) 3) AB 24T SD 2 Container carried 12 SD 2 bombs (pp 96-8) 4) AB 36 Container carried 36 1 kg or 24 2 kg bombs (p 96-8) 18 SK 36 Three-Sided Container carried 36 1 kg or 16 2 kg bombs (p 96) 0 AB 42 Container carried 42 1 kg inceediaries (pp 99-96)

100)
7] AB 70-1 or Mark 705 Container carried 3 Mark S

// AB 7/01 of Mark 7/D Container Carrier Sakar 3 Fig. 10 (1) Mark 7/D Companier (2) SD 2 Sombs (pp 101-3) 9) AB 7/01/1 Container Carried 9/SD 2 Sombs (pp 104) 10; AB 7/01/2 Container Carried 9/SD 2 Sombs (pp 104) 11) AB 7/01/2 Container Could carry 224 SD 1 Sombs, or 144 SD 2 Sombs, or 17/50 16 Abombs, (pp 1067)

12) AB 250-3 Types I and II Containers carried 108 SD 2 bombs (p 107) 13) AB 250 KZ Boden-Causanner could carry 19 parachute flares and three SD 2 bombs (p 108)

14) Mk 250 LK Flare Container carried 41 single candle parachuse flares (pp 108-9)
15) Mk 250 BK carried 25 modified red flares and three

53) 2 bombs 'pr 108-9; 16) BSB 360 Container carried 320 I kg incendiary bombs (p 110)

17) BSB 702 carried 702.1 kg incendiary bombs (p. 110) 18) BSB 1000 carried 570.1 kg incendiary bombs (p. 110) AB 500-1 Container could early one of the following fillings: 37 SD 10A bombs, 28 SD 10 bombs, 184 1 kg incendiary bombs, 28 SD 10R b

or SK 70 kg Trench hombs, an well as 50 or 100 kg French bombs (pp 113-15) 21) AB 500-1B Container carried 28 SD 10FRZ hombs (p. 115)

(p.115)
22) ABD 500 Container carried 133 1 kg incendiary bombs (p.116)
733 "Streubrand C. 500" Container (ht Scatter Incendiary bottes)
18 (p. 116) (p. 116

Bomb. carried 1200 green celluloid incendiary boxes immeraed in water (p 117) 24) Mk 500 "Bodor" Container carried 9 or 1,5 single candle flares or 6 SD 2 hombs (p 117) 25) AB 1000-7. Container carried one of the following fillings: 620 1 kg bombs, 246 1 kg and 234 2 kg boebs, or 572 2 kg bombs (p 119) (See Illustrations).

Continuous Methods of Manufacture of Explosives, See Konsinuigilische Verfahren.

Cardine Charge Cestage. According to Cito 31-68 p. g. propellent tokes in smaller guns (califer before about 200 mo; ran the fall length of the charge and three was only one acction, while for larger just the charge was introve sections, the Houghtquische (main charge) and the Verkardsche (droward charge). Bont heree charges were in silt bage charges were in silt bage to the charge was the charge with the charge was the charge with the charge in the propellent were called full baddones (increase) charges of

proper out the state of the sta

Coronite (Coronite). As early blassing explosive used in stone quarties and ore mines. Na chlorase 72; NG 3, TNT with DNT 20, parafilio 4, vegetable meal 1%. Has been replaced by Percotonite (v).[7].6able, Manual of Suplosives etc., MacMillan N Y (1943), p 52].

"C" Process of Precision Costing of Metols. See Shell Mold Process. Cracking of Sulfuric Acid. See Lurgi Spattaniage.

Cresylit (Cresylite), Same as Trinitrotresol.

-C-Steff (C-Stuff) A liquid rocket fuel-consisting of 50/50 mixture of hydraxine hydrate and methanol. The combination of this fuel with concentrated (80%) hydrogen peroxide (called II-btoff) was used in the rocket fighter plane Heinkel 173 at the end of WFF

Reference: J.G.Tachinkel, Chem & Eug News 32, 2586-7 (1954) (Propellants for Rockets and Space Ships).

Note: According to CIOS Rept 30-115 (1945), pp 8-10 & 13, the C-5491 consisted of hydrazele hydrates by, methanol 59 and total water 15% water was, incorporated in order to reduce the combustion temperature in reduce the combustion temperature in reduce the combustion temperature in reduce the subsection of the combustion of the combu

The following plastic marcials were reported to withained the action of C-Seoff very well; polyvanyichlende (v thout softener), polywande and bung?s. Polytchylene was good, while polyvanyichlorde with nicresylphosphate as softener was not austable. (See also B-Soff, M-Soff and T-Soff)

CTR. See Chemisch-Technische Reichsanstalt/

Cyclenite See Hexogen.

Cyclotel. See Composition B.

Dahmen Explosives were invented by b.J. von Dahmen of Austria and used in Austria, Be.gium, Germany and probably England. In Germany they were manufactured by Castroper Sicherheits-Sprengatuff A-G at Castrop (Readision)

a) Am nitrate 92 U, phonanthrene 5.5, K bichromate 2 5% b) Am nitrate 30, sawdust 15, K bichspingte 3, NG 30% Reference: J.Daniel, Dictionnaire, Dunod, Paris, (1902) pp 791-2.

Debmenit A (Debmenite A). One of the Favier type explosives; Ap-nirrate 90.8, K bickcomate 2.2, asphthalene 6.5, cuccuma -0.5%; vel of denn 3680 m/sec me d 1.02 [biarshall, v 2 (1917). > 493.

Decomposition Number of Hydrogen Preserids in the ratio of the necessration of personal after being heated at 95°C for 24 hours to the original concusration (CIOS 50-125, p. 125).

& Dansporing ' Agent (Entkupferungsmittel). According to Die Aren Tech Rept 1555 (1945), p 30 the following compositions were found in some German amountains capeared during WW E.

al Tin 60, lend 38, binmuch 1.8 and settmony 0.2%; uned in some 37 mm HE shells.:

b) Tin 61 and Read 39%; used in some 40 mm HE shelin.

According to ElEnglesburg, The Ordnance Surgeant beers According by Elegahuburg, The Ordanece Surgean; har 194th to submit Genum decopporing nagate consistency—
some desiral Genum decopporing nagate consistency—
some distance of the property of the control of the c

Dog Barding Process. See Tiefhunder Verfahren

Definantion Temperature Test (Verpuffungs-Probe), See "Imirias or Explosion Temperature Test.

Beley Compositions (Versignius green industries). A belet description of such compositions in given in the general section.

Shortly before WE, the Germans developed analysis delay compositions suitable for electric decomment. There . (KILO ) and antimony (Sb). Following is a brief description of the author of preparation as conducted at the Traindorf plant: Propodice:

The dry crystalline K permanagene was ground in a special mill (called Kollopies) to a perpicle, sine of about 0.006 min! The antimony, received at the plant in a fairly finely sevided stars, was ground, without in a many emery services mean, was ground, without previous drying or other manman, in a special mill (called Schwingsishle). The resulting powder was sep-around in an mix\*elucriance into fine (griot nine under 40 micross) and courses fractions. The courses fraction yes placed on a vibrating sieve containing 16,900 meabused as coalne Sb. For the preparation of quick never an comme 3b. For the posparation of quick bearing nitrates the fine 58 was used, while for sleer nitrates the cognet meetral was more suitable. For instance a utilities of 36% fine 5b with 64% Klady Leaded into No 10 delay element. (qv) bened in 3-3; to 2-3 necessies, while the nitrates of 35% course. Sb and 64% Killed barned in 6.5 to 7.5 neconds. With a lower content of Sb and a higher content of Killed. the burning time was longer, It ofter to obtain a composition with a Greated delay, the coarse Sb was blended with the first material.

Following is an example of the calculation for preparing a delay composition with a desired delay-

Suppose that it is necessary to prepare 80 kg of delay, composition consisting of 36% 5b and 64% KhhrO which would burn for 4.87 sec in a No. 10 delay element. The time of luquing of course material is 7,50 sec and of the fine 3,50 sec.

All the afrectangle methods in used for computation (as in cultomary in Germany and some other countries of Europe) the enjoyintion will be made by setting up the data shows below:

7.50 1:35 Xkm (course Sh)

3.50 4.85 (80-X) kg (fini) 551

In this configuration 1.35 is the difference between 4.85 and 3.50 and 2.65 in the difference between 7.50 and 4.85 seconde.

From the above, X may be calculated as follows: .

 $\chi = \frac{1.35 \times (80-X)}{2.65} = \frac{1.35 \times 80}{2.65} = \frac{1.35X}{2.65} = \frac{100}{2.65} = \frac{1.35X}{2.65}$ 

2.65X = 108 - 1.35X or X = 108 27 kg (course)

The amount of line material is then (80-X), or (80-27)-

After thoroughly mixing 27kg of course Sh with 53kg of fine 5b, a small sample consisting of 36 parts of mixed Sb and 64 pm of KidaO, was preped and instead in a No 10 delay element. If instead of the desired time of 4.85, 5.15 ner was actually obtained, then this Sb mixture would meed to be corrected by adding some fine 5b (3.50 nec). The amount of fine Sb to be added was calculated being the "rectangle" method as described above and a small namely of new, corrected, mixture was prepared. If the burning time in a No 10 delay plement was exactly the desired 4.85 sec, the total batch consisting of 36% of "corrected" Sb and 64% of KhinO, was blended and pelleted. The pellets were ground and acreemed union nieves of 225 and (961 meshes per cm2, The material which passed the 225 meak nieve and was remined on the 963 meah nieve was removed to storage while the material which was remined by the courses sieve was reground and rescreaned as above. The fine material (dust) which passed through the 961 meak nieve was saved for adding to compositions rensidered to be too slow harning. 2

Before commencing to load a delay alement (av) with the above prend mixture, it was rented as follows: S) Mointure content. A weighted sample of a delay nixture (5-10g) was hented for 2 hours at 110. If the loss of weight exceeded 0:2% the entire batch of delay com-position was dried for reveral house at 50° in a green homes even before it was loaded into delay slowques b) Particle usus of Sb-A-weighed sample of a delay mixture was leached in a Good-type encible with het water to remove the Kidto and the particle size of the dried weighed 5b powder wan determined (Refa. 2

and-31 Note: The method for determination of persicie nine in not described in the references given below.

A differenc type of delay composition commissing of her red lend (Ph O ) and silicon was used for the 200 mm HE morar bomb. The composition in the sleeve was: HC 3.9. red lend 75.5 and silicon 20.6%, while in the pelles is was: NC 2.7, red lend 72.0 and silicon 25.3% (Ref 1)

J) W.A. Tonlingen Jr. Pic Acon Tech Rene 1555 (1945), a30 2) R.Anberoft, BIOS Final Rept 833, H M Stationary Office, London (1966), Item 2, pp A3/7 to A3/12 3) Anna PB-Rept 95.613 (1947) (Manufacture of

Demantors and Detectating Compositions)...

Dolor Elements (Vernogerungshörper). The elements to

during WVI consisted of metallic sleeves (of Al. Cu. benes, or coppered Fe) loaded with "gasless delity composition" (a v ) consusting of powdered KMnO 64 and Sh 36%; The alcoves had an inside diameter 3.30 to 3.45 mm and on nutside diameter of 6,45 2-0.02 mm The length (L) of the ulceves when using brass was as follows:

	-		-*				
Delay in sec	. 1	2	. 3	4.	. 5,	6	
L in man	,	7.3		10.5	13	13.5	٠,
Delay in sec	7	8	. 9	10	11	-12	
Linma	18.5	. 21.2	24.2	27	~29.3	: 32	ĺ

Londing of the sleeves was done by means of a 70 ton hydraulic press at pressures of 950 kg/cm2. Depails of the method nev given in Ref 2, nection F.

The above delay stements were used in electric decontors, described briefly under Deconstors (Electric). .

Beferences: 1) R. Anberoft, B I O S Final Ren No 831, H M S O . London (1946)

2) Anon, PB Rept No 95 613 (1947), Sections F & G.

Demolition Charge (Spreagladung oder Spreagkorper) The following charges were examined during WVI by U S Ordnmee Dept establishments: "

s) Bohrpatrone 28 (Blasting carrridge' pattern 1928) A castridge 3.9 long and 1.2; diameter, consisting of 31/4 oz of TNT or P A wrapped in Ward paper. b) Spreagpairone Za. A carridge 4.1. long and 1.4 diam., consisting of PA wrapped is varnished paper

c) Sprengkörper 28 (Demolition block, pattern 1926). A block 23/4 x 2 x 11/2 consisting of 7 ox of TNT or

P A wrapped in waxed paper d) Sprengkörper 28 coasiating of two blocks of TNT.

total wt 7 oz placed in a bakelite container 3 x l. 8 x 2.2'
e) Sprengbischee 24 (Demolition block in container, parmen 1924), A block of TNT or P A weighing 2 lb 3 ox placed in a ziec container 7.9 x 2.9 x 2.2 f) Sprengbither 24. A block of 90/10 - PETN/Wax

veighing 2 lb 3 oz

g) Gebulbeladung 3 kg (Concentrated charge 3 kg). The demolition charge consisted of several blocks of TNT or PA with a total weight of 6,5 lb, placed in a zinc container (7.7 # 6.5 x 37 provided with carrying handle

h) Gebullteladung 10 kg. Sumt as above except that it contained 22 in TNT. The size of zinc container was 103/4 x 78/4 x 53/4"

i) 12.3 kg Demolition Charge, A triungular block of 27 15 RDX/TNY in a seamless strel container.

i) Plastit . A block of plastic explosive RDX/Oil weighing 1 lb 1% oz .

h) 300 g Hohiladung (Hollow charge). A shaped charge of a HE; size 31/ high and 2,8 diameter

1) 400g Hohlladung, A shaped charge consisting of 12 oz of PETN/Van in an aluminum case 3.1" high and 2.8' in diam

m) 12,5 kg Hohlladung, A skaped charge consisting of 28 (he (with a container) of TNT in a sheet iton case 8.1" bigh and 11" diameter

a) 13.5 kg Hohlladung. A shaped charge consisting of 2) th 1 or (without a container) of 50/50 - RDX/TNT in a mild ateel container 9" high and 131/2" diameter o) 50 kg Hohlladung. A shaped charge consisting of

110 lb (with a container) of TNT in a sheet iron came 30.2" high and 20" diameter, provided with a carrying

p) 500 g Hafthohlladung (Nagnetic antitanle hollow charge). A shaped charge of a HE weighing I ib I va oz s) 3 kg Hafthohiladung. A shaped charge consisting of 1 1b 50/50 - RDX/TNT mixture in a metal container. 7.7" high and 6.2" diameter

s) 3,6 kg Hafthohlladung, A shaped charge consisting of 21/4 lb TNT in an aluminum container.

1) Picatinny Arsenal Technical Rept No 1555 (1945), p.51 2) U.S. War Dept Technical Manual FM 5-25 (1945). PP 129-132

3) Dept of the Army Field Manual FM 5-25 (1954). pp 196-7-

Durisity of Fragments Test. See Fragments Density Test. Darie Mining Assaclation Testing Station, See under-Gal leries. Testing, in the general nection.

Defenctionsdruck (Blast Pressure). See general section.

Percentions Whighalt (Ability to Desgrate or Sensitivity to initiation). The value is usually expressed by the smallest numbered standard cap reclaimed to initiate the explosive under test. For instance, in Naoun's book Schiensand Speengaroffe, 1927 p 121, it is hald that is order to initiate Ammont ? « No 3 cap is required; while for Ammonit 1 and 5, a No 1 cap suffices, This manne that Ammonit 2 is less weasitive to initiation than are summerines I and 5 The same rest is used in Italy.

Detenotionspesshwindigkait (Velocity of Detenation). See general section.

Detentions betraying Schlagueite (Transitation at Detenation, Striking dimmes), Also called "Sympathetic Detuention". The test is similar to the Gap Test described in the general section. (See also Four Carridge Test).

DETONATORS (Deconatoren); BLASTING CAPS (Spreng-kupseln); Ignitors (Zündern), A short descripcion la given in the general section, A. Stettbacher, (Ref 1) defines detonators (Deternatoren) as reinforced blasting caps which are designed to initiate explosives which are difficult to deconate by some of property blearing cape.

The following military decounters were examined at Picationy Arsensi during WWE and described in Ref 4, p 30; Detenuter, R contained '4 grains of 75/25-L A /L St mixture over 6.9 grains PETN:

Detenuter T contained 3.9 grains of 42/58-L A /L Sc mixture over 10.8 arains of terryl in an Al cap. Both

determances were used in HE hand stenades. Some of the captured German detonators in fuses ( some times called gaines) examined at Picatiany Arsenal

during WWI are listed in Table 11. Following are the principal current commercial decommends

and blasting caper Sprangkapaul A consists of an Al shell, 11 mm long.

4.36 mm in diam-dilled with a 6 mm layer of PETN whiching 0.11 g (base charge) and a 3 mm layer, weighing 0.16 g of 80/20-L A /L St mixture, called in Germany the "Muschange" (primer mixture). Both the primary and secondary charges were press-loaded at \$60 kg/cm

Table 11

		Detenator 2		
		· Composition (%)		
. Designation	Upper charge	Intermediaté*	Lower charge	Uses .
Gnise A 'Gnise B Gnise Bhelet 40 Deparament Gnise'	1. A 19,L St 41% L A 69,L St 31% L A 62,L St 31% L A 62,Sb <sub>2</sub> S <sub>3</sub> 7 ** and absulter 11% L A 45th cover charge of black powder L A 164 and	RDX RDX	RDX 92, war 8% RDX 92, war 8% RDX 92, war 8% PETN 87, war 13% Tauyl 49, THI 51% PETN/INT	Not indicated  Land idne 37 mm HE ned 50 mm HE night to 47 mm APRN shell
<b>"</b>	L St 85.6% L A 55, L St 45%	•	PETN	Some 50 mm, 75 mm,
				105 mg shells

good, B. consisse, of top Al shell, 17 June Joseph 7.74 in in dish, filled with a 6 mm layer of PETN weighing 0.40 p (base charge) and a 4 mm layer, weighing 0.40 g of "Minchanni" (pellinsy charge) (Ref 6).

es in both shove case the L A was of technical grade. contining 92-94% of PhN, and not more than 0.35% mointage. in Ref 7. The so-called "Normal appear cap No 8" (Kupfer-Normalspeenskapar) No B) consists of a Cu abel), 6.3 to 6.9 mm in diam, press-loaded at 480 kg/cm with 0,7g FNT (bear charge), placed in two layers each weighing 0,35g and with 0,55g of MF as the primary, charge. The same Ref 7 compaces the proparties of flat-bottomed cape with those of should charges. While the Trausl tost value and East crushes test values are practically madifected by a change in the shape of the borrow, the lead place test value in much higher for the shaped charge.

A.hiso, (Ref B) describes the following Garana decommons: Demonster Brisks No B consists of a shell 40 nm long, 6.39 nm in disse, filled with 0.5g Tenyl compressed at 2000 kg/cm<sup>2</sup> (bese charge) and 0.3g of J. A /L Se mixture (primary charge), December No. 10 of D.A.G., Troinderf contained 1,25g of Tetryl and 0,3g of L. A./L. Sr. mixture.

Abbraviotions: L'A Lucd axide; L'Se Lead styphnass: M.F. Mercury Inliminate; MP Annor-piercing; RM Roand none; HE High-explosive; PETM Pentnerythristi tetranitrite; ROX. Cyclonies; or Hexogen; TMT Trinitrocolugue. References:

- 1) A.Stettbacher, Schiene und Sprengenoffe Leipzig (1933), pp 348-352
- 2) C. Bayling & K. Drekopf, Sprengevolle' und Zändmittel Springer, Berlin (1936), p 151
- 3) PB Rept 11,544 (1945), part III, p'10
- 4) Picatiany Ardenal Tech Rept 1555 (1945), pp 30-31 5) A.Stetthocher, Spreng- und Schienntoffe. Zlieich (1968).
- 6) W.Schneider, Sprengrechaik, No 10/11, p 186 (1952) 7) J. Kirsche, Sprengtechnik, No 12, pp 228-32 (1952)
- 5) Technical Report TM 9-1985-3 (1953), pp 547, 343, 566, 568, 569

- Misses (1953), p 77. (See also SIOS Final Rept 644 and CIOS Rept 24-5)
- Botanit (Detonice), A type of permissible explosive used before WVI. Some compositions are given in Table 12

Composition ned some properties	(pondered)	.5	Detonic 6 (or 14A)	Descrite 14
Am mittans	82.7	68.0	82.0	82.0
K nitrose	• .		4"	10.0
NG(mixed with NC)	4.0	4.0.	- 1	1 .
NG(stesight)		2.0	4.0	4.0
Aromatic nitro-	1.0		1.4	
Compress			i	1.
Vegetable meal	4.3	2.0	- A.	1.5
Wood meal		1.4	2.0	-
Coal (powdened)	- 1	4.0	0.5	-
MNN .	-	-	1.0	2,5
Alkali chloride	-	22.0		
Na chloride	.8.0	, .	10.5	
Onygon Balance Trayel Test	+1 0.3% 275ee	~4.8% 220cc	+10.9% 230cc	+13.6% 235ce

Abbreviations: MMI Mononitronaphthalone: MC Nitrocallulous

- 1) Naouer, Schices- and Sprengessife (1927), p. 146
- 2) Naoim, Niwealyceria (1928), no 434-5
- 3) Beyling and Drekupi, Sprengacoffe und Zündnittel (1956), p 141.
- Diethylanglyhaidinises (Diethyleneglycol Dinisesse). See

Dielykeleises.

Dianin oder EDD (Ethylenediamine-Diniprite). See general section. EDD was used by the Germans in Fillent No. 20. No 23. No S4 and No 36 as well so in the following minnies of minare same

a) EDD 45 and Am nitrate 55% b) EDD 45, Am nitrate-53.5 and Al 1.5%.

Note: Mixture of EDD and Am nitrate forms a cutectic which permits cast loading. Reference: Alfied and Enemy Explosives, Aberdeen Proving Greend, Md (1946), p 145.

Diezebenzelperchloret (Diazobenzeneperchlorate). See jeneral section.

Diamentre ben mip wechlaget adec. Nitrodiane ben zeiperchloret, known also as Blitspulver is described in the general section under Diazobenzeneperchiorate.

Dichen (Dennity). See general section.

Dicyandland (Dicyandiamide), he annufecture in Germany in described in BIOS Final Report 1720 (1947), (See also in the general section).

Didl-Pulver. An abbreviation for Digiykoldinitratpulver (Diethyleneglycoldinitrate Propellant) [ Stertbacher, Sprengand Schiesstoffe (1948), p 44 ].

Diagol funitors, See Fuel Oil Ignitets. .

Diethylen eglyeeldinitrate. See Diglykeldinitrat

Diothylnitramine, Hoxenitre. See general section.

Diglyholdinitret Diglykolnitret oder Didt (Diethvieneglycol Dinitrate) (DEGDN or DEGN). Preparation and properties are given in the general section.

Following is a brief description of the German method of prepn as practiced at the Krismonl Fabrik of DA-G: a) 420 kg of technical "Diglykol" (DEG), contg about 1% of sthylenegiyes and about 0.1% of water, was see dlowly with stirring into 1218 kg of mixed acid consisting of 65% airric atid and 35% sulfuric acid. The acid was cooled to below 25° by brine circulated in cooling coils. Teral time of aittation was 22 minutes. Note: A great excess of airric acid was used in order to retaid the decomposition of the otherwise extremely unatable apent acid. While the NG apent acid remained fairly a stable for days, the DEGDN acid had to be worked up at once since it decomposed mpidly on standing.

b) After the reaction was complete, the mixture was 'cooled to 15° and cransferred to a separator where it was allowed to stand for 7 minutes. The apent acid (mitric acid 8-9, sulfuric acid 64-66 and nitrated products 4-5%) separated at the bottom, while the oil collected as

the upper layer

(b) The spent acid was then transferred to a "denitrator", while the oil, was run into the "primary washer" contg 300 litera of water stirred by air. The resulting acidic wash water contained an appreciable amount of nitrid acid and was Direct designated

d) The oil was iun into the "main washer" to be treated (with vigorous air-stisting) first with 500 I of cold water, then with 150 lof 5% ands ask sols, preheated to 60

and finally with 500 l bf cold water inhoratory and if the KI test at 82" was not less than 20 min the material was considered to be satisfactory s for use in the prepa of the so-called Rohpulvermasse (q v ).

The yield of DEGDN was 710-715 kg or 170% of the DEG used; theoretically it should be 777 kg. .

The purified DEGDN had the following properties: light yellowish oil, d.,1.38 to 1.39, N content 14.1 to 14.25. ir p below - 10", by (decomp ca 162" and puifs off ca 200°), calorific value 1070 kcal/kg (vs 1715 for NG), water culculated as liquid, impact sensitivity with 2 kg weight 160 cm (vs 4 cm for NG), solubility in water ca 0.4% at room temperature, and volatility ca 4-5 times more volatile than NG.

DEGDN was used in the so-called . "cool" propellages, such as "G" Pulver and "Gudoi," Pulver, References: 1) O.V.Stickland, PB Rept No 925 (1945), p 57

2) A. Stettbacher, Spreng-und Schiesstoffe (1948), pp 61-2 (See also CIOS Repar, 28-61).

Dimethylammenium Mitrota.Sec Di-Salz.

Dimethylethylenedinitramine (DMEDNA). Described in the general section, It was investigated by G.Romer. PBL Rept #5,160, p 14 as a component of some explosive compositions, such as:

- 1) DMEDNA 12, RDX 50; R-Sais 36, DPbA 1 and
- unaccounted 1% 2) DMEDNA 2.5, RDX 96.5 and DPhA- 1.0%

Dimethylnerrowies (DMNA). Described in the general section. It was investigated by G.Romer, PBL Ropt-\$5,160, p 13 as a possible addition to R-Sals in order to reader it castable at temps of TOO, or lower, it to render it castable at temps of IOC, or lower, it was decided that incorporation of about 10% at DMNA. was sufficient to give satisfactory results.

Diau. German abberviation for Dinitronaphthalene

Dinitronilla (Dinitronnillas) (DNA), Described in the general section under Aniline. The Germans used BNA during WWH as an addition to TNT. The resulting explosive was rellow in color, less nowerful than TNT: and much less sensitive to impact of friction. is produced larger projectile fragments than did TNT [Allied and Enemy Explosives, Aberdeen Proving Ground (1946), p 901.

Dinitronisel oder Disal (Dinitronnisole) (DNAss) See general section under Anisole: was used by the Germans in some explosive compositions, such as "Amatol No 40" (q v ).

Dinitrohenzel (Dinitrohenzene) (DNR), See sesecal section under Bentene. It was used by the Germans as an extender for TNT and as a desenitizer for some explosives, such as RDX. The addition of it to some high-melting explosives tendered them suitable for cast londing [ Alfied & Enemy Explosives, Aberdeen Proving Ground (1946), p 111 ].

Dinitrodiglykel. See Diglykoldinitrat.

Dinterachlerhydrin (Dinitrochlor phydrin) (DNCH or DNCIH) in described in the general section under. Chlorohyura-Dintreglykel (Dinitroglycol). See general section,

under Glycol. Dinterenaphehalin, Dina, (Dinitronaphehalyne) (DNN). San

general section under Naphthalene. It was manufactured during WV I, tagether with trinitrosaphthelene, at Sentia Fabrik at Panlubica, Czecho-Siovekia, and nied in some composite explosives. Reference o:

11PB Rept No 1870 (1945) 2) Allied and Enemy Explouives, Aberdoon Proving

Ground (1946), p .117 .. (See also in the general section under Nupchalene).

Distrophenol See general section under Photol.

Digitosteluel (Liquid) (Known in the USA as Drip oil); Van used by the Germann in some commercial explosives, such as Donneis.

"Dithet" Rado were deviced included to the none of A/P (motiganisma) bombs for produce's heart's above the ground. This security a present embed of effective fragionate close to the surface of the ground. Preprinter would be ineffective if the heath had presented the soil prior to horozon, in the case of "shaped charge hombs" the Direct red aread as a strand-off sloyer to improve the effectiveness.

di the charge (Ref. 2)

There were two ppen of Disort code a) daman sasel ruber (1/27) dan 2/3/6 Peng a 2/77 dan 1/4/6 Peng) and 3) appare wooden sicht (2/25) by 2/29 and 22/6 long) (Ref. 1). Belevenene: ent ci the Army Technical Mannai TM 9-1985-2

1939. p. 4 1 J.H.Robinson, J.R.Copell and A.B.Schilling of Piculiary algertion (1955)



Dip enterry thrithenen (tret ... (Dipenmerythritelhennnitrate). See 'general section, and also V.Brin, S S 27, 73-76, 125-27, and 136-58 (1932).

Diphonylamin (Diphonylamine) (DPhA). See general . section.

Diphonylurothes ' (Diphentylurethene) . See general pretion; was used by the Germans during WWE as a atabiliser in some of their amokeless propelients ('PB Rept 11,544 (1944) ] .

Henry, over-10 his Eventshere agreed to twhethere as policies by papared in Germany, during WP II. in order to combar the shortage of TNT had other high embeavier. Disable was people by the reservice of squared blumelylambles are proposed by the state of the same and the same a

Hufarences:
1) H. Valor: et al., German Developments in High Expionives, PB Rept No 78:271 (1947)
2) F A T Final Rept 1055 (1947), p. 7,

Disintegrating Retaining Rend Projection, such as 105 mm and 130 mm, were updificutions of "sales" projection. They contained at the shoulder a detachable guide hand, which was almost completely, transcred by cute, spaced 120° spars. The band yeared as the bourrelet. The rotating bond, and try holder were located se the base of the bhall, which was layed to receive there. The bolder irself was in three devectable regenere bold a pasition by the soft fron rorating band.

as past ione by the sort from rectating hands.

It is believed that sterry leaving the gene, the bourroign and the driving band hadder such spitz into three separate of the driving band hadder such spitz into three separate of merel which intrictly had them; explication which remained not only had a better nearetyname. The projection which remained not only had a better nearetyname have the conventional perfective the also we observed the series of the series



2) TH 9-1905-3 (1953), PP

Distance Pièce (Essumobe) (Cross Tube). When a propelicat



References: E.Englanburg, The Ordanace Sergenet, May 1944, p 521
2) A.B.Schilling, Picaciony Arestal; private communication

DAW-Pulver . Fast-burning NC propellant used in 7.65 mm scandard carridges for piatols and revolvers. It was in the form of small greenish cylinders 0.4 mm liam and 0.4 mm high, which were for graphited. [ A.Stettbacher, Sprang- und Schiesstoffe, Zürich (1948). p 45 1.

Octoorle A design used for launching the Phil

Denacts (Donarice) A type of miling explosive manufd in Germany for many years. It is known that at least one of donorites (an used during WWE (under the name of Filler No 36) for military purposes.

Table 15 gives the composition of some mining donntiers

Сопровілієв (%)	Donnie 1 (Gelstia type)	Donnit 1 (Powdery type)	Donasit 2 (Powdery type)
Nitroglycom Nitroglyco	22.0		4,0
Colled conoa	1.0	2 21	
Am aitme	55.0	81.5	84.0
Na airrate	10.0		\$
Areustic nivocom-			3.0
Trinitrotoluene	. 5.0	14.0	
Distincteduracy (liquid)	6.0	. 2.0	•
Wood meal	0.8	2.0	9.0
Dye(Caput mortum)	0.2	, 0.5	

Noter . The first two compositions were manufactured during WWI at the Krimmel Fabrik, of D A -G (Ref 2). The componition of Donarie 2 is given in Ref 1. Act cording to Veichelt (Ref 3) there are three current denseites in Germany having the approximate composition: An nitrate 86, Sprengill (nitroglyceris with nitro-alycel) 46 and TMT with Al powder 5-10%. The properties of these donagines are as follows:

Temperature of explosion. C. 25,80 to 3345°C Volume of gases of explosion at NTP 837 to 924

in 1/ks Carridge density (including me paper) 0.87 to 0.98 Specific pressure, kg/cm2 9900 re 10270 Velocity of decountion, m/sec 3800 to 4850 Trauxl tent value, co 435 to 4630. Impact sensitivity with 2kg weight,

in cm . . (See also under Commercial Explosives). References;

1) C.Beyling K.Drekopi, Sprengeroffe und Zundmittel, Springer, Berlin (1936), p 94 2) O.W.Stickland, General Summary of Explosive

60 to 70

Plants, PB Rept No 925 (1945), p 69. 3) F.Weichelt, Handbuch der gewerblichen Sprengtechnik, C.Marhold, Halle/Sanle (1953); pp 37-8 & 375;

Depositioner (Double Igniter) for acoustic mines, developed Despicituades (Double Igniter) for accountic mines, developed during WW II at Trousded Fabrik D. A.G. Thuse mines consisted of two delay detonators (crimped ison a sletw) and monard co-axially with their bases pointing away from each other, and with their bases pointing away from each other, and with their base-based romactered in artises. Jet summinators withing, The fine-beside had one marked from the control of the assembly. This desegrates permitted the fusebrade to be fixed by applying an propriate rotage to these two rings. A Reference: W.Taylor et al, BIOS Final Rept 644 (1945), p 17.

"Dore" Same as Seventopol Gue, called also Guete

Dortmund Gallery, See under Versuchustrecks

Drehspiegelkamers (Rozating mirror camera):See yearen!

Beilliagspulver. Shore tubular powder for bowitners (Haubitne) such as the 10 cm Haubitne Brunewig, Das zauchlose, Pulver (1926).:p 131 ).

Duelin (Dualine), Under this name, Schultne, in 1868, patented a minture of wood nitrocelluloss and NG. Under the same name, Dittmar later patented a mixture of - 50 NG, 30 nitrated sawdper and 20% saltperer (Naoum, Nitroslycenia (1978) p 282 ].

Durchachlage- and Strahlungaprahen (Penetration and Radiation Tests). These tests are similar to those described in the general section under Lead Place Test and Steel Place Test . The German test is also called Brisanzplattenbeschuss , which means Bridsance Plate Shooting. References

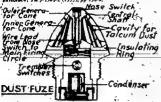
1) A,Stettbacher, Schiess- und Sprengetoffe, Burth, Leipzia (1933), p 361

2) A.Stertbucher, Spreng- und Schienntoffe, Ranchig, Zürich (1948), p 119. . .

Dust Fuse, developed during WW II it the Rheinmethil-Bornig, laboratory, was based on the principle of charging a condenser electrostatically by means of a dust field. The fuze was located in the nose of a bomb or a shell. Prior to dropping the bomb, the plastic cap covering the alits on the head of the fuze were removed. As the bomb fell, the az stream entered the fuze via the slits in the puter generator cose, . This action disturbed the talcum powder and created a dust cloud in and around the forward part of the fuse. When the dust particles came into violent

the charge leaked from the condensor, the remaining therese

The fuzze was used in some shalls, such us the 37 mm and some smaller bombs, such as the SD 4 and SD 16. Reference: TM 9-1965-2 (1993), pp 190-2.



Dunit (Dunite). An explosive made is Germany before WW1 and placed on the British Permitted Line in 1914: NG 31-33, collection cortem 0.75-1.3, NaNO 27-29, wood ment 8-10, Am oxalare 28-31, moisture 0 so 2.5%; max charge 12 uz, bellistic pehdulum nwing 2.45° vs 3.27° for British smadard Gelignite containing 60% NG [ E.Barnett, Explosives, Van Nontrand, NY (19)9), p 136 ].

Dynamite (Dynamite) According to Scotthacher (Raf 2). dramates may be subdivided into the following groupes a) 'Gubrdynamit (Gubrdynamite), b) Sprenggeintine (Blanting Geintin; c) Gelatine-dynamit, and d)

Sichgeboienaynamie (Safery Dynamice) According to Markhall (Ref 1) the following three dynamics given in Table 14 were nutherized between Wel and We f for use in German coal mines: 4

Сомроменсь	D <sub>2</sub>	namir .	
	1	2	. 3
Nitroglycesia Collection recessa Nationa and/or Knitenar Nationa and/or Amaitman Negrotable and/or aide- soda and or chalk Nitrotolisase and/or aide- naphaleus	61 re 63.5 1.5 to 3 '25 to 29 6 to 9 0 as 2 7-	0.5 to 3	0.5 to 2 50 to 74 1 to 6

Note: According to Weichelt (Ref 3) the properties of "Dynamit I" are an follows: temp of explosion 3600 C, vol of seson at NTP 603 1/kg, carridge denaire 1.45. specific pressure 9600 kg/cm2, veloc of deton 6350m/r. sec. Trauki test value 18500 and impact nonsitivity with

Dynamit N (DN). A current dynamite suitable for use in the demalition of reinforced concrete and steel construction, Its composition and properties are, given by Weichelt, as follows: RDX 70 and nitroglycol (gelatinized) 30%; temperature of ex-- plosion 4470 C, volume of games at ATP/746 T/km. - cartridge density 1.34, veloc of detoration \$200 m/sec, specific bressure 42538 kg/sm2.

See also Ammondynamit, Ammongulatine, Donnzit Gelatine-Dynamit and Ernatusprengardife.

Referencest 1) A:Murshall, Explosives, Churchill, Loudon, v 3 (1932). n 109

2) A.Stettbacher, Spreng- und Schienstoffe, Rancher, Zürich (1948), pp 82-90 3) F. Weichelt Handbuch der gewerblichen Sprongrechnik

C. Marhold, Halle/Saule (1953), pp 34-5, 375,

(1917), p 493.

Dynamico . Dynamica are ammonium nitrate explosives

used in Germany, Russia, Italy, ore ; a) Am pitrate 90 and red charcoal 10% b) Am mitrate 95.5 and charcoal 4,5%. Reference: A.Marshall, Explosives, London, v.

Er4 HERA (Explosive). See under Brentzeprangeroffe. E (Series) Tooks such-as 8-100, See Experimental Tooks:

Earth-Dissingment' Test (Cratering Effect Test, or .. Mining Elfoct Test). In order to test the efficiency of bombe and land mines on explosion under ground, the Germann buried an item (nuch as a 250 kg bomb) and then exploded it. The volume of the resulting creter (in cubic natern) gave an approximate idea of the power of the explosive charge,

Reference: O.V.Stickland, PB Rept No 923 (1943). Appendix 7.

EC (Pulver). One of the sporting propellantes collect cotton 28, guncotton 26, Ba and E nitrate 38, camphor 2.0, wood pulp 4.0, meisture 1.5 and gelesinings 0.5% Brunswig, Das snuchlose Polver (1926), p 1347.

EDD. One of the abbreviations for Ethylesediaminedimitrate, called also DIAMIN.

Effective Culculated Colorific Values of Propullanta If it is assumed that for w certain mappie velocity and a given projectile, the product of the charge weight and enlorific value of a propellant in countries, then by knowing the calonific value and weight of a plon pellant, it is possible to calculate the calorific value of a second propellant of a similar nature (if its charge weight had been previously determined experimentally). For instance, if for one propellant the values were \$20 heal and 4.3 kg and for a second propellant X heal and 6.2 kg thenr -

x = 820 x 4.3 3526 - 570 kcal/kg.

This may be considered as the "effective calonific value" and it differs from the value determined in a calorific bomb, which is usually higher, e g 690-700 kcal/kg, for the example cited immediately above. In calculating the life of a gan barrel, it was con-

sidered preferable to deal with the "effective calorific values" than with values obtained in a caloralic bomb. (See also under Erosion of the Bore and under Energy Content of a Propellant Charge)

Reference: PB Rept 925 (1945), pp 16 & 82.

Eindrühtzunder (One Vire Electric igniter or Primer) is described in Beyling and Drekopf. Sprengatoffe und Zundmittel, Berlie, (1936). p 220.

Einfache Zünder (Simple Ignicer or Primer) is described in Beyling and Drekopi, pp 172, 174, 177.

Einhaltsaulver, See Standard Propellant.

Ele-Man Torpedo. See One-Man Torpedo.

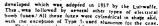
Finanhahnverkehrerdrung, Verschrift zur Prüfung von Secongaraffon- (Railroad Traffic Regulation, Instruction tor Testing . Explosives). Information on this . subject may be found in:

To Zeitschrife fut des gesamte Schiene- und Sprengeroffweren (abbreviated as S S ), vol 24 (1929). Supplement 7) Kaat-Mefz, Chemische Untersuchung der Spreng-und Zundstoffe (1944), pb 188, 223, 235 & 238.

Elamine 42 ades Flascheneismins, See under Landmines, and also on pp 281-2 of TM 9-1985-2 (1953).

Electing Projectiles See under Krummel Fabrik, Dynamit'A -G Pressing of Explosives, etc .

Electric : Fuke (Elektrischer Zünger). The development of electrical time and impact fuzes had been carried on in Gesmany since, 1926 and the greater part of the work was don't by the Rheinmetall-Bornig Co. under the direction of H.Rhulemann, The original object of the development was to produce for projectiles as electrical time fuze which could be set at the instant of fizing, However, before this work was completed a successful electrical bomb fuze was



The inner part of a typical fuze consisted of two sections: a) The upper section, called the swech block, was molded polystyrene which had been machined to take various plunger contacts, the trembler switches, and in some cases the long delay igniter bridge.

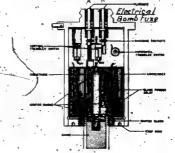
b) The lower section contained the storage and firing condensers, the resistances and instantaneous and short delay igniters. All these items were held in place by a black bitumen calking substance. The condensers were constructed of metal foil strips separated by war paper, all wound on one cardboard cylinder. The carbon resistances were usually located inside. this cylinder. Some fuzes, as for instance E12. (9). described in this section under Aerial Burst Faxes. contained the glow discharge tube, also called the long delay, cold cathode tube. The iguager block (isted into the bottom of the fuze and contained the black powder (lash pellet, the cover with three perforations leading, from the pellet to the igniter bridges, and the short delay train,

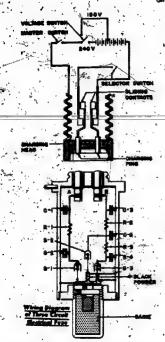
The electrical bomb fuzes were aither impact or time Following is a brief description of operation of a three

circuit electrical impact fuze illustrated on next page

As the bomb was placed in the plane, a charging head was clamped on the luse head. The charging pins contacted the plungers and depressed them so that they could make electrical contact with the storage condensers. The two charging pins were connected to the sliding contacts located in the charging arm. These contacts closed when the bomb had fathen from 1 to 3 inches from the rack. This prevented charging of the fuze while the bomb was still in the aircraft. The two sliding contacts were connected to the positive carminal of the 240 volt, battery. The B plunger circuit was coppected directly while the Aplunger circuit was connected shrough, a selector switch 'which had two positions t open (MV) with delay, and closed (OV) without delay. The battery was rapped at 240 and 150 voice and the two leads were run to the voltage switch. This switch was set at 150 v for level bombing and at 240 v for dive bombing, but it could not be used to open the circuit. The voltage switch was connected to the master switch which was used to iettison the bombs. The master switch was connected to the charging head which contacted the fuse head and completed the electrical circuit through the fuse body to the storage condensers.

Prior to the release of the bomb, the master awitch was closed completing the circuit from the barreries through to, the fuxe except for the sliding contacts in the charging head. When the bomb was dropped, the charging arm was extended, causing the aliding contacts to meet for about 1/3000 of a second, the ground return circuit being through the fuze body, If the selector switch was closed, both plungers received the current and the storage condensary C-1 and C-3, were charged. The charge of C-1 leaked slowly through the resignance Rel into the firing condenses C-2 (The time required for the current to pass from C-1 re-C-2 and build up sufficiently to fire the igniter is called the arming time) At the same time the charge of C-3 leaked through R-2 into the firing condense; C-5 and vlso pare of the current leaked through R-3 into the firing condenses C-4. On impact, the tremblers of switches S-1, S-2 and S-3, made contacts with their cups, causing the current to flow through the igniter bridges. These were thereby heated and fired the starch compositions surrounding them. When all three igniter bridges fired simultaneously the instantaneous bridge fired the flash pellet and deconated the bomb through the normal explosive train. The short and long delay trains started to burn just at the instant of





If the selector switch was held open, then the churce, west through plunger B to-the storage condenser C-F and acthing passed to the instantaneous circuit. The circuit through the resistance F-2 or the stantaneous Co. the resistance R-2 to the condenser C-5 became through the reasonace N-2 to the consensor 1-2 became assess before the circuit through both resistances N-2 and R-3 or firing condensor C-4. If the bush high been dropped from an altitude of less than 1170 fr, the letter circuit would not be assed before impact and the ignitive bridge associosed with the trambler switch S-7 would fire the long delay paller which acting through the explosive train the fune would detounte the bomb. If the bomb was dropped from an akitude greater than 1170 fs, best circules would be sensed before impact, but because of the sheres

delay train used in conjunction with the trembler switch 5-5. the short delay would initiate the final explosive train

Electrical time funes (ElZcZ) contained ensentially the same baric parts as the electrical impact fuses (ElAZ). sexume that the trembler switches were replaced by a succum tube which became conducting of a critical prederemined voltage, At the instant the bomb was started on its traectory, an electric charge was put on the storage condenset, and another smaller charge was put on the firing condenses. The time netting of the fune was adjusted by varying the sames of tharge placed on the firing condenser, During flight, but of the there on the storage opndenses, leaked through the senintor to the liting condenses. As the charge on the fixing condenses increased, the volume acrous the vacuum tube also increased; When the firing voltage of the tube had been reached, the firing condenses discharged through the tube and the imiter bridge thus firm a the fuse.

Electrical bomb fuses are described in Refs 1 and 3. and new linead in this work, ander Page. Some of these - funes are described in this work under Acrial Burst Funes. An electrical time fuze (ElZtZ S/30) for use in proecules is briefly described in Ref 4, pp 605-8. Prior firing the projectile, the fune was charged nither by hand or by a machine, by putting 300 to 500 volts action the shell and an insulated contact which put voltage on the samelar scorage condenser. The charging could also be done by allowing the "feeler wire" (connected to the electrical circuit of the fuze) to contact the "muzzle charging ring"

ge 'the projectile was 'leaving the gus. A brief description of a muzzle charging ring is given in Ref. 4,7 606.

A device, described in Refs. 2,9-422 and 4 p. 623 as the electric fuzz, 'ERZ 39, was used for igniting the black' powder chargetyphich set off the propellant of 15 cm and 21 cm rockets. This device is briefly described in this ,

work under Rocket Propellant Igniter. (See also under Electrical Igniter and under Igniter).

North Parkers | North House | The E9-1983 (1942), Enemy Bombo and Fusien, File Numbers 2321.5, 2321.6, 2324.92 & 2174.01

2) Ason, fiftunce Bomb Disposel Center, Aberdoon Proving Ground, Md (No less): Gorman Artillory Projectiles and Funes p.3/2 3). An Open of the Army Tech Immuni TM 9-1985-2 (1973). Common Dombo, Francis, Referre, etc., pp 125-137 and others. 4) Anne, Dept of the Army Tech Menuci TM 9-1985-5 (1953). German Projectible and Fuses, pp 605-7 and 623.

Atvetrie Fone Primer Composition See Primary and Initiating Compositions.

Electric Igniter (Elektrischer Zünfer), Ameng the numerous remover the statement of the statement of the second of th

Elvatrie lyntrere and Primers (Blakteinake Zundue) Uned for Commercial Emplosivée. These devices, described in Bayfing-Drekopf, Sprengetoffe und Zindmittel (1936) may be subdivided into the following

- n) Einfache Zünder (Simple igniter). It consisted of a capsule (Hulse), a priming composition (Zandnata) and electric lead-in wires connected to a beidge wire (B a D, pp 177-222)
- b) Zunammengenerare Zunder (Composite insitue o or primer), such as Spangainder (denounting primer), consists of a simple electric igniter combined with a detonator, (B & D. pp 174 and 222-24)

c) Zunder mit fest eingenetzter Sprengkupsel consists. of a nimple primer into which a No 8 blasting cap (Sprengkupnel No 6) is firmly bet ( See B & D, pp 174 and 225) d) Unterwasserzunder (Underwater primer) is described

in Ben D. pp 225-26

Zundschnurzeitzunder (Time inniter with fuse); consists of a simple primer combined with at least a 20-cm piece. of fuse (B.& D pp 175 and 226-29) .

() Schnellreitzunder (lagrantaneous igniter be primer), deacribed in B & D, pp 17" and 225

g) Unterwasser-Schnellzeitzunder (Underwater innzantaacoust ignines or primer), described in B & D. op 475 and

Abbleviation: B & D Beyling and Drekopf.

Electric Muschilled or Fusehand is the combination o bridge wire, igniter head and lead-in wires employed in electric blasting cape and deconstors. , a (Clos Rept 24-j. p 7 and also under F .sehead Manufacture).

Electic Prezimity Foke, See Proximity Fuze.

"Elefert" (Elefhan). A tank destroyer known also es Schwerer Panner Jogd "Elefant", It was an improved version of "Ferdinand" (q v )-dee alga under Panner.

Elekrentembe (Electron-bomb). See general nection).

Empfinellichtott gogen Roibung (Sennicivenenn en Friction), See general section.

Empfinellishkeit gogan mochmischen Einwirkungen (Sensitiveness to Mechanical Action). See general sestion,

Empfindlichkoit gugan Stone (Sepultiveness to Shock or Impact) See general section.

Empfindlichkeit girgen Wome (Sensitivanean to Heat), also called Chemische Beständigkeit (Chemical Stability) is described by the general section under Stability.

Energiogobalt des rouchlosen Pulvern See Energy Content of a Propellent Charge.

Energit (Energite)-According to Nabum (Ref 1) . . Energit was & connercial explosive manufe after Wat by Nobel's Denamit A -G. The explosive was prepd by wet grinding various kinds of surplus double-base propellants in Excalsior" mills between steel discs, to a particle size of 0.5 to 2 mm, followed by drying and patking in carridges 25 so 30 mm diameter, This explosive was used to a great extent in porash mining.,

According to Pepin Lichelleur (Ref 2). Energit and Triwestfalir were industrial explosives prepared by bleading a smokeless oppositiont (left as surplus after WW B) previously wetted with about as equal- mantity of a solvent auch as furfurof or accrone, with liquid aromatic autrocompounds and oxidizing agents such as alkali nitrates or chlorates in a kneader. The atmosth of these explosives as, determined by the Trauxl rest was 330 to 350 cc; velacity of detonation 3000 to 5000 m/ eec. References

1) P.Naoum , Nitroglycerin.esc, Baltimore (1928), p 449 2) L.Pebin Lehalleur, Poudres, etc., Paris (1935), p 457. | See also Nitroglyceria-Aitrocellulose Explosives (Mining Lists 33, 35 and 36) as well as Triwestiskit SN J.

Energy Content of a Frepellent Charge According PB Rep 925 (1945), p 82, the energy content is equal to the charge weight of a propellant multiplied by its calorific value. For a given projectite and a given initial (murrle) velocity, the energy concent is constant and independent of the type of propellant used. For instance, if for a certail initial velocity of a projectile the charge weight of a propellant with a calorific value of 820 cal/g is tol kg a propellant of 570 cales (such as a meroguanidized propellant) would require a charge of 6.2 kg. | See Effective Calorific Values of Propellants )

Entflemmungaprobe (Flagh Text). The text die applied to smokelean propellance is described by H. Branswig, Dan rauchlose Pulver, (1926) p'304.

Entflommungsponkt ader Entflammungstanparatur (Flash Point, Kindling Temperature). The test is described in the general section.

Entkupferung smittel, See Decoppering Agent.

Entlustungszünder (Antilifting Type Ignifer with HE Churge), See under Igniter.

Entweederung uder Trucknung (Debydration, Drying), See general section.

Englan Rekete (Engine Rocket)-One of the guided rockets developed and used by the Germans during WVI. It has been described by: 1) F. Ronn, Jr , Guided Mineilles, Rockets and Torpedoes, N'Y (1946), p 43 2) A.Ducrocq, Les Armes Secrètes Atlemendes, Paris (1947).

p 99 - 3) TM 9-1985-2, pp 229-32 See also Great Enzian or E-4 Misnile)

Entsündlichkeit (Inflammability). See general section.

Entrandungsgominah (Innition Mixture). See general section

Entaindangembe (Imition Test) See several section.

Entaundenemunkt (Ignition or Burning Point) Ser general acction.

Entaundungstumperatur ader Verputtungstungeceter (Ignition Deflaration of Explosion Temperature, See general section.

Enlaruke (Earth Stuke). A tocker-assisted 1800 ke armorpiercing bomb (PC 1800 RS) used by Stuka bombers against land targets. This bomb is mentioned, but not described, in TM E9-1983 (1942), File No 2324.92,

Erasianius a Priming and Initiation (Literionafreie Zundung). Priming and initiating compositions containing mercuric fulminate and the chlorates (such as KClO.) have been known to cause considerable ground of gun barrels. In 1904. N.Zinaler of Switzerland, therefore, proposed that Ba saits' such as the attrace be substituted for the chiorace saits. These new compositions were known in the industry as "rostifere Zundungen" (rust-free primers). As these substances were not entirely satisfactory, further search ceaulted about 1930 in the invention of compositions based entirely on organic compounds, such as Tetracene (Tetrasen). There substances, called "erosionfreien Sinonydsatzen", were manufactured before WA I by the Rheinisch-Westfallische Sprengstoffe A -G .in Numberg.

27, 397-99 (1932), Die karesienufreie Zund-

Car 43

2) E.van Horn, ibid, 28, 37-42 (1933). Die urunionefreis and Schienetoffe, Rauchel, Zurich (1948), pp 106-107.

Erecton of the Born (Etenion der Gewehrliefe, Bubenh. natural oder Bedressbrennung). Evenien of man is dentribed briefly in the general section.

In this sestable a abort account in given of recent Gos-man efforts to reduce the session of their mean.

Dog so the fact that the armet of tanks and skine during WWE was made thicker and thicker and the speed of the planet protect and present, the mutale relocity of gunn was increased to ad much as \$300 fa/age. In order to achieve such velocities if was necessary to use propellages of high ballistic potential, such ne those containing NG. As these propellency were "hist" (calculfic value about 950 kcal/kg) hey could excusely eventual time lowering the life of a pur considerably.

For insuace, the life of Att-mos using a 950 heal/kg prescriber was only 1700 firings and for a \$20 kral/kg propolings about 3500 firings. Even before this number of firings was reached the gas became less effective because of the secone of spaces between the walls of the barrel and the prejectle. This occupe of passes not only reduced the chanker present thes change reduction in number to oclay of the projectile with consequent reduction of range and paintention) but also coused piccoulve musule flash. As the doctores in efficiency of an older fee in usually one-photos of territories the propelloss theres, this land to a still be about the flash. In order to reduce the clash In such increased charges, more and more potassion soliste (or other flesh reducing name) had to be incorporated. As their upones are inser materials; they diminish the officiency of the propullant.

riding of a yea, the result of which is always usestinfactors secucion of the shell (spin) with associated fune failure. Particularly had breaten, was obtained with high velocity some (such no these with a muzzle velocity of about 3300 ft/sec). For them the use of propellence having calerdic value of \$20, or 950 heal/kg was absolutely prohibitive and it was necessary to use cooler proprillages.

Duction the fact that charing the last war Germany suffered considerable sheerage of averlehardening merals, such as Cr. Ni, Ma, Me esc' required for making modern gun barrels, and due so the shortage of labor and in some Cases of ordinary strel, the replacement of groded man was quite a serious problem. Fortunately for the Germans, a series of "cool" propellents or low calerific value propellents were developed, such as the "G" Pulver by Gen Gallwitz and the Gadalaulver by Dynamit A.G. The use of these perpellenen peolonged the life of a burrel to an many as 17,000 fitings. This high figure was more than the Corners over espected to achieve. As was mentioned previously, the previous NG propellant with a calorific value of 950 kcal/kg permitted a sunimum of 1700 firings, when used in AA guas. When the German's decreased the calquific value of some of their NG powders to shout \$20 km1/ks, the number of Stings was increased to about 3500. Therefore, it was calculated that each ardection of about 130 kcal/kg should double the life of a gua. When Gon Gallwitz prepared his "cool "G" propellages, the talgrific hanh decomination

values of about 690 kcal/kg. As it had previously been found that a reduction of 130 heal/kg doubled the life of a gun berrel, the Germans thought that the new propellants would permit about 2 x 3500 = 7000 firmum. lastend of this value, they unexpectedly obtained 15,000 or even 17,000 fixings. If previous German assumptions were sight, then the new propelients should possess calorific values of 550 to 570 hcal/kg and not 690 hcal/kg as the cultrific bomb showed. The values 550-570 heal/he wife considered as the "effective entoringed colorifi values". Those values were used by the Germans in newference to the calorific bomb values, such as 690 kcal/kg. Rafgrences

- 1) Uto Gallwitz, Die Geschützladung, Henrenwaffenan Berlin (1944)
- 2) O.V.Srickinso, set al., General Summery of Explosive Plants, PB Rept 925 (1945).

Ernotzdynamit. (Substitute Dynamits) in may dynamics is which a large proportion of NG is substituted by home other explorive in such a manner that the resulting composition, in equal in scienach to the original synamics [P. Nacum, Schieve-and Spresqueette, Strinings, Deceden (1927)

Erems-Goodens (Substitute Shell), Due to the shareage of steel and other memle, the German, during WV L. develoced, among many other substitute amonalcies itume. a port of HE-Shaperl shell which was made of a combinetion of uncrete and seed accup. These shells were used toward the and of the war. [ L.E.Simon, Gomen Research in WWI, Wiley, N Y (1947), p 190 %.

ERSATZSPRENGSTOFFE (Substitute Explosives). Due m the acute shorman in Germany of THT and other ausdotic nimocompounds, neveral industriate explosive mixtures were developed and used during WVE. Many of the "Emails" explonives were developed at the Krimmel Plant of Dynamic A -G others at Christiansurds and other plants - 24

- In the preparation of various melp-leading compe the following wends were noticeabled
- oc a) Substitution of RDX for part of the THT in an b) Substitution of DNB for TNT in ametole
- c) Substitution for TNT, by airreproductions such as
- disitrodiphonylamine, henen itrodiphonylamine, trinimonylene, disitrosophthalene, etc.
  d) The use of low selting hydrous inormalic nicese
- compounds, such as Ca, K and Na nitrates, so permit the reduction or replacement of TNT e) The use of Al powder an an ingredient
- f) The use of mincellanious organic ingredients such as oven, PE (pentserythrist), manidise nitrate, ethylane-
- disminedialune, methylaminenius te erc a) The use of sodium chloride (up to 60%) at of so-called Scheidenehl" ( powder consisting of a minuser of Ca and
- Mg silicants) in order to reduce the smoont of THT. Most of the explosives containing these substances

are much less powerful and brissus than TNT alone. Note: From German documents, it appears that the critical period with regard to the supply of explosives and assess action was reached in August 1944. From that date, serious shortages occurred, it was in September 1944 that on account of the shorings of NH NO, the High Command ordered the use of mixtures of 50/50 TNT/MaCl, or even 40/60 TNT/ NaCl. for loading shells. However, previous to this, mititures of 50/50 TNT/NaNO, (Sodatel) and 45/40/15 TNT/

Teble 15

			٠.		Ψ.	De	agents of	n and	% Co.	apositio	4				١	· · ·				
	Am					, Ame					HE			EXA		KMA			NeCl	TNX
Components	39	39a	40	He I	14-2	H- 9	H-8	43c		S-6 modul	5-19	5-22	(see 'note)	\$ 26	E-4	Block	s-te	\$-19	Explo- sive	Explo-
TNT	50							30	40	30		7		-		40	٠		40:50	80
Am natrate	40-45	35	40	50	Sp	50	50.	45		٠.	55 '	45	45	155	44	٠.	32	73.3		
Na nitrate	1 .	١.		l٠	1 :	1.5		١.	١.		. 9	9	9	9	10	1.	6-8	17.4		
K autrate	14.	١.	ŀ	١.	1 8	٠.	25	1	-	1 4	4.2	3	3 .	4.2	٠.	J* • •	0-2	-		
Ca(NO <sub>3</sub> )2,4H <sub>2</sub> O	u - 4			15	15	15	١.	10		-		۱.		١.	١ -	iz.				7.
RDX 32 2	5-10	15	10	25	25	20	15,	١.	١٠-	-	15	14		١.	<u>.</u> • .	4, -	10	١.		٠.
PH - Sala	1 -	١٠,	١.	١.	1.5	10		17 .	۱.	-	· .	14	144	١.	٠.`	-	10	١.	1 -	
+ Urea	1 .	١.	١.	I٠	١.	١.	į ·	1 %	١.	- "	1.8			1.8	3	1 -	١.	9.3	٠.	١.
Al pawder	1 .	١.	١.	١.	1 4	١٠.	· ·			15-25	15	15	15	25.	. 30	10	40			
HNDPLA		١.,	ŀ٠	15	1	. •	ļ.,	Lane.	30	35-30	١.		14	1.5	24	30	١.	) ~		٠.
DNN	1 .	1∹	۱.	1 -		١.	١٠	١.	۱.	1 . ?	١.	,	1 .			20	١.			
DNB		50	50	1 -	١.	] -	١٠	١.	١.						١.		١.	1 -		١.٠
PRTN .	1 * 1	l٠	١.	10	١.	١.	10	1 .		١.	١.		١.		١.	**	1.		1 ' :	1 •
GaN	1	١.	10	١.	10	١ -	١.	15				1.	1 -	٠.,		1 **	1		w.**	ı٠
DNE THA	1 -	١.	I٠	١.	Ι.	١.	l	١.	20	15-20			1 •		· ·	١.	١.	-		٠ ا
- Na chloride.	1 -	١.	I٠	١.	4 -	٠-	١.	[ -	1 :	1 -	١.		1.		1.	1 .	1 - 1	1 🕌	60-50	1 .
TNX	100	1	ŀ	١.	1 -	١.	ŀ٠	( :	1.7	- 3	*		1 - 1		J • •	1 ·.	۱.	1 -	1	29

Note: Composition S-22 semetimes exploded during the loading of projectiles. Abbrevietnen Am Annochus Delb Disirobensger Den Vinitrosephikaler Delbend Disirobishphamiar Geld Gundider direct; MNPA Disirobishphamiar Geld Gundider direct; MNPA Etasirobishpraylantier FTM Pearatryshriot connatries; PH-8uln, Edytesedimine disirates; RNA Cyclasize, on bengen; TMT Traintroslesser, TMX Traintroslesser.

NaNO\_/Al had been used to a considerable owtone. Table 15 lists the principal "substitute explosives" used by the Sermona duting WML.

To this table may be added the following: a) An explosive composition prepd by LG.Farbeninduratic by aimsting a mixture of MNX, methylaniline and MNT. The aissased product consisted of TNX 45 sected 50 and TNT 5%

b) As emplosive mixture of the Krummel plant of D A -G contained TNT 45. Am nicrate 40 and Al powder 15%. le was autable for cant-loading bombs, grenndes and

c) An explosive minture of the Christianstade blant of DAG was a slurry of 70% Ca(NO.) 4H O and 30% TNT.

The following explosives, listed in the German section under fieir proper names, also belong to Ersatzuptengatoffe : Amerol, Austrianal, Ammonit, Di-Salt, Fillers Nos. 13, 134, 13-111, 19, 20, 52, 56, 57 (or Abonachit), 60, 61, 64, 70, 84 and 88, Forinit, HDD, MAN-Salz, Myrol, Pil-Salz, Tetanspreagatoffe (TeNMe explosives). Terramethylnitraminoret mmethylmethane, TETRA-Salz, Trinitroethanol Perchlorate (and in the sensemble section under Perchlorates) and TRI-

In addition to the explosives mentioned above, before and during WD I, the Germans developed and used several new employives and employive mixtures, which cannot be called "autorinices" (Frantzenrenestoffe) because they were more powerful than the previously used military explonives, such as TNT and P A. These new poweful explonives included PETN and RDX, as well as various neintures containing these aubitances. References:

1) O.W.Stickland et al. Survey of German Practice and Experience in Filling High Explosive Items , US Office of Technical Service, PB Rept No 1820 (1945), pp 11, 15, 16: 24, 29

2) O.W.Szickland et al. General Summer of Explosive Plants . PB Rept No 925 (1947); Appendix 7.

"E"-Sein, Henogen (RDX) prepd from formaldehyde, ammonium nitrate and acetic ashydeide; see under Hexoges in this section,

Eachbuch ainder ader Verzögerungszünder Eschbech Ench back Primer or Teniter. Delayed Action Primer of Eachbach ] . It was described in Ger P 379, 939 (1922) and in Beyling-Drekopf, (1936) pp 232-35.

Note: W. Taylor et al. BIOS Final Report 644 (1945), pp 3-16 describes these devices under the terms of "Eschbech Gasiens Delay Detonators" or "LT Electric Detonature"

Enniguether (Ethyl Acetate), See general section.

Ensignmere (Acetic Acid). See general section.

Etagonguss (Multiple-Pouring or Increment Loading). Seseperal section under Loading of Ammunition.

Eshylacetanilide.See Mannol.

Ethylanadianinadinitrate (EDD). See Diamia.

Ethylonosiycaldinitrate or Nitragiycal.

"Ensure". Shell Founder Press in a vertical type peers which combines paneling and dervine operations. It was designed the speed by Emmero A. G. Levertrews of the best of the following places: Eraspeith A. G., basilpartic Carlotte, and Carlotte, places places: Eraspeith A. G., Sandpartic Carlotte, A. G., Sondrad, A. G., Standard, A. G., Dienerley, P. Dienerley, E. C. Fall Rept 668 (1946).

Emerimental Mine. Ser Versuchseureche.

Expressionadoral (Pressure of Explasion), See greenel section

Ambientenphreft (Explosive Fouce or Power). See genomi

Englantensperator adar Detenutionstyspecator" (Temper above of Employing or of Decempion). The general nortice,

Surfactor reflect of Employing), See general section

Eminature Developed by H.Weiter or al., Berroom 1942 and 1945, a seem of chamiers under the direction of Dr Hour Water and which included Dr Bonne Water, developed new cal explosives by using authoral and ammenly as starting managinal. The work was seasond in the Degenera Labourtorine in Frenklert on bisig and was manalured to Tetachen, Carcharlambia 'in 1944. The most important employed developed by this group years MAN-Gale, blyed and EKTRA-Salm. Of these substances Relate considered leyed to the passe important, followed by the TETRA-sale and inst. by

A few less Imperper employing as well as desiratives of the above these subsencess, and versions mixtured on the above these subsencess, and versions mixtured one taking them were also knowledge, such net Dédale, Fernit, MAN-fails plus NANO, MAN-fails plus MI, NO, MAN-fails purchassor and TRI-fails.

Releaser: M.Walter et al, Gerner Development in Mich Ex-plositus, PIAT Final Rope No 1035, PB Rape No 78, 271 (1947)

Endance Proposed Yassians, A waspen designed by Zipper-meyer to be maid against airplanes depilorated in ministens the effects of tempology, in his paperiments, Z. shot, a projectile filled with pendered real shor and a charge of finely grained rough-nucleons double have propellent from a mortas. When the projectile approached the vicinity of a place the propellant was exploded by means of an initiater. The combination of the (newed component of vehicles) of the cont particles (created by the movement of the projec-tile) and a largest (component of vehicles) (created by the explosion of the propolities) was supposed ne of tomado. Such a tomedo was expected to cause a plane's wing to seep off. High speed movies of this obsesses recon indicated that a considerable rossex effect was achieved. The development work was not compressed [ L.E.Simon. German Rennarch in WW E. Wiley N Y (1947), no 183-4 1.

(See also item C under gramme) Fabrik of Dynamit A -G ).

- Emlacive Rivet. Ser Sprenguiet .

Embasive Suppliments, Anger the imprenting inventions of WVE were small wooden books containing large charges of explosives and designed to combat Allied shippings When the deconating device was not, a bonn aminut the home-work was sufficient to set off the explosive charge. The boars always operated in packs and were accompanied by a command boot. When targets were picked, the pilot set the decounting device, locked the steering gedr in

nonition and allowed the boat to drive at top speed against the target, while he jumped overhoard so be picked up by the command boat [ Army Orderace, 29 pp 378-80.(3945)].

Extra-Carbants of Extra-carbonize's NG 35, collect cotton 0.3, Ba nitrate 4, K nitrate 25.5, tan mepl 4.7, Ra carbolante 0.5%; velos el detos 4070 is/sec at d'1.20. F. E. Barnett, Explosives, Van Nontrand, N Y (1919) > 194 }

Emiliation (or Sweeting) Test (Autachwittengsprobe). This test was conducted in German essentially as follows:

A 20-z sample of TNT, melted and cast as a cylinder 18 see in diameter, was placed with the better part on a sheet of special Schleicher & Schille filter paper resting on an aluminam plate. As a reference standard a similar pellet of/Grade A TNT (sp 80.4 to 80.6") was placed about 100 mm away. The ensemble was placed in an over and left there for 6 hours at 72". The diameter of the circle produced by the exidete was separated and if it was not greater than 35 mm the TNT une considered an Grade A. Any diameter between 35 mm and 70 mm /ven reassisted as Gmde B (a's: about

In addition to those rwa gorden the German manufacture Grade UK (unbeyomlining - very scallined) with a . a p. w

30.7" to 80.8% 30.7 to 30.57.

Near: In inserenting to the char suffice (attlies) rediced.

THY resulted a my of about 40.5° in code: in order in pans the Garman vanishation rous for Garde, A, while TNY produced by a nivine acid refining secorcie, developed by Dr. Wille of Allender Plant of DA -G , passed the Grade A tout with Alliender Plant of D.A.G. posted the Gode A test with a p of only 90.2. This may be explained an indicate in godes to obtain a parentelly nec-archite TMT it is necessary to resource the high 16 of the two pincipal importa-tion of crude TMT; DMT and the imposers (but such passes) of TMT.—Of three imposition, the DMT being of low-sp tonous higher candition and in the most mederals the As these imposition subsets of the location of crystals of subsets. THT, the Simplest way to move them is to time the TRT, the illustratively by tokeney them in its frame the expensal with a liquid high, local either sent with the imputition of dispersion without stracking or discovery them without stracking or discovery dispersion. ITML is has been claimed that while the faint, acid peopled resource both the DRT and the indirect of TRT, the sulfie (settling)-mented resource only the immunity in the large means of the CRT and the thing of the DRT by the CRI acid view on some or the ball of the DRT by the CRI acid the set of the case such a large means of a cilit that the DRT would he washed out mechanically sogether with the isomers. Such treasumer would give a high a p (ney 50,6 ), but it is murconomical because a significant amount of alpha TNT is removed tomether with the impurities, if the TNT purified by selline has a high ap (say above 80.2") and it still exades, there is a possibility of the presence of some DNT in addition to inomers of alpha INT, and other imputition.

It is claimed by the inventors of the aitric acid parification process, that practically no danger of exadation exists with 80.2 TNT purified by their method because the bulk (or nearly all) of the DNT has been removed and if the sp is still lower than that of pure TNT, it is due to the presence of imperities which are less liable to cause ou-

Abbreviation: up Setting point (freezing point), References

1) C.H. Brooks, Explosives, TNT Manufacture and Development Work in Germany, PB Rept No. 22,950, US Office of Technical Services, Vachington, D.C. (1945), p. 15

2) O.V.Suckland et al. Survey of Germin Practice and Experience in Filling High Explosives . U S Office of Technical Services, Vanhangton, D.C., PB Rept No 1820, p % Fallhanntemmbe ader Fullhannumprofung (Falling Hammer Test Drop Test or impact Test). See general section and

. 1) A.Stettbacher, Spreng- und Sprengstoffe, Leipzig. (1933) pp 371-73 ·

2) A.Stuttbacher, Spreng- and Schiesetoffe, Zurich (1948) pp 118-120.

Ger 46

Fourtpotence', (First Cartridge, Tank Cartridge) . Hollow charge antitank rocket grenade fired from a tubular discharger. The smaller model. Fourtputrone I was laser called Penterfeust 30, Klein and the larger model, Faust-

persone 2, was called Personnest 30 (Ref 1).

The avenade for the Faustratous consisted of a large war head (contg HoC-HE) and a cylindrical body (tube) terminating in a suil to which were attached four apring steel stabilizing fine. The tube contained a base fuze and a booster. The projector was a simple metal tube in which was located a propellent charge contained in a waxed cardboard cylinder held in position by a set screw. On the opposite side of the set screw was an igniter situated below a flish hole. On the top of the tube was a firing mechanism with a release button, firing pin and spring and a salety catch. A folding sight, adjustable for a range of, 33 yards, was used for siming. The grenade was armed by unscrewing the tail and inserting the booster and fuze, open ends facing each other. The fins were wrapped stound the tail and the cylindrical part of grenade was inserted lete the launcher tube. The pressure of the fine against the inside of the tube served to hold the grenade in position. According to instructions furnished with the weapon.

the fitting mechanism was cocked first, the ensemble was placed under the right arm (the laft hand supporting the forward part) and the sight adjusted to a range of 33 yards. The weapon was then fixed by depressing the release button, thus allowing the ortikes to go forward. When the wespon was discharged, the propelling charge drove the grenade towards the target, while, a portion of the games blasted down the rear of the projector tube thereby offsetting the secoil. The back biast of the gases resulted in a jet of flame/6 to 8 ft long at the rear, which made it extremely

deaprose for sevone so stand behind the firet-The tube was discarded after firing.



The original models (Faustremone 30 and 30 klein) were very much feared by the soldiers assigned to use them, but the improved forms (Panzerfaunt 60 and Panzerfaunt 100) were sale to handle. The model '60 weighed only-13% lb and could be fired standing, kneeling or pront. is had as much flexibility as an ordinary ziffe.

The hollow charge of the war head was capable of penerrating & of homogeneous atmor plate and within the firing range there was no practical variation in the penetrating power,

ing power.

New models were provided with confirm projectors, carrying larger propelling charge, which allowed the range to be increased to 150 meters (Refs 4 & 5) (See also 44.5 mm Recoilless Greande Dischargei, under

Weapons). a Note: Smith (Ref 5) calls Faustpatrone the "German Recoilless Geenade Discharger". ' References

1) Anon, Enemy Var Materials Inventory List , SHAEF Office of AC of S. G-4 (1945), p 159

2) Anon, Intelligence Bulletin, 3, No 7, p 9 (1945) 3) A.J.Dere, The Ordnance Sergeant, Oct 1945, pp 10-11
4) L.E.Simon, German Research in WW IL, J.Wiley, N.Y.

(1947), p 184 5) Anon, German Explosive Ordnance , TM 9-1985-2 , (1953). pp 339-40
6) W.H.B.Smith, Small Arms of the World, Military Service

Publishing Co, Harrisburg, Pa (1955), p 522
7) G Coghian and H.H. Bullock, Museum of Picationy Assensi,
Dover, N ]; private communication (1955).

"Fordinand", A self-propelled mount consisting of SS me A/T gun on Pakpiw VI (P) (See under Panzer). Note: Its improved version was known as "Elefant"

Farro-Alloys were extensively used in war plants and for the manufacture of ammunition and weapons," One of the largest manufacturers of such allows was the Badische Wolframers GmbH, Söllingen. Reference: CIOS Report No 30-55 (1945).

Formatiliatum (Ferrosiliaide or Ferrosilicon), See genera section.

Fourthigkeitsprobe (Hoistorn Content Test). See general sec-

Fourillie-One of the guided missiles, developed and used during WW II. ( See under Guided Missiles).

Feverleachmittel CS (Fire Extinguischer CB), Chlorobromo methans. CH. CiBr. It was claimed to have been more successful as a fire extinguisher than carbon tetrachloride because it was beavier and less toxic. References CIOS Rept 25-18 (1945), p 26.

Fauerweife (Firearm) . See under Weapons ..

Fauermerkerel, Fauerwerkerkungt oder Fauerwerkskörper (Fireworks). See Pyrotechniks.

Fightenhers oder Kelsehorium (Spruce Resin, Rosin or Colophony). See general section.

FILLER OR BURSTING CHARGE (Füllung oder Füllbulver) (Fp oder FP). Following is a list of explosives used for

filling projectiles. These explosives are designated as Filled to I, Filler No 2 etc. Some of them have prefixes such as Fp 02 which means TNT, or Fp 30/30 which means 50/50 Amazol. Filler No 1 (FpO2). TRT pressed in cardboard or metal containers; was used for loading shells, depth charges, land mines, or for the prepa of demolition charges

Filler No. 2 (Grf 88), P A pressed in cardboard or mem! containers: was used in shells, land mines, denth and demolition charges Filler No 3 (No). PETN pressed: was used as the

deconager and as a filler for grenades and small shells such as 20 to 50 mm Filler No 4 (Fp .OZ). TNT loose in paper containers;

was used in archades Filler No S Granular P'A ; was used as a bursting

charge in stick hand grenade 24

Filler No 6: TNT/Nax + 95/5 in blocks in cardinard containers Filler No 7 (Fp O2). TNT pressed; was used for loading

shelis, muxiliary boosters, bombs (heavier than 50 lbs) and chemical ammunition Filler No 5 (Fo D2). TNT, cast, was used for loading

tiE shelle Filler No 10. to O2 + Fp 3 + Fp 10, pressed; was used

Property of the Bally of the

was need in AP shells Filler No 12, Fp 02 + Fp3 + RDX/Vex - 90/10, pressed in continued containers; was used in AP shells Nose: la the above mistures Fp O2 mensu pure TNT while

Fp 5, Fp 10, and Fp 20 meen TNT plus 5, 10 or 20% wan respectively. In AP shells, the filter varied with the section of the shell. The higher wax-content TNT was in the same where the shock of impact was more intense. shorand, the because surround constanted of pute THT Filler He 13 (Fp 40/40), NH NO, 40 and TNT 60%; corresponds 'to Americas 40/60 Ameral. Its imposes

density rest gave 39 meters vs 40 m for THT. It was case leaded in GP, SAP and A/P bembe and shells. Fille No 13e (Pp 30/30). Same as, 50/30 American Amatol, its fragment density was;35 m vs 40 m for TNT; it was case leaded in GP bombo and land mines such an Tellessies

Filler No 73-313. NR NO 270, TNT 20 and Al 10%; was used for filling CP Make. Assider mixture consisted, of Am niwate 74 and THT 26%

Puller No 14 (Fo OZ) . THE cast was used for filling GP. SAP, AP and A/P bombs.

ne is the present form To O2 was also used as no our liery become in all HE bumbs over 10 kg and as a burnter in chemical passantion

Piller No 15. THT 90 and Al 10%; was used in the shells of mountain artillers

Filler No. 36, TRT cast the an aluminum container + PETR/Vax - 90/10 as an explosor; used in some shells and as a core in subsparing miner;

Filler No. 17. TNT/Al porder (90/10) case + PETN/ Was - 90/10 no no exploder; uses not specified

William No. 474. Marrist of DNAnn/Am niwers/RDX 34/32/14, with biscuit of Am sittee/Ca airross/RDX/ PETH/combined water - 46/21/20/9/4 Filler No 18 (Pp 03/NS-80/20). THT 80. RDX 19 and

Names over 1%; was used in some shells Piller He 19. Am nitrate 35, TNT 35 and Al 10%; was, used in none HE shells (mountain trillery) Piller He 20. Am nitrate 53.5, EDU 45 and Al 1.5%;

Filler, No 21, Am nigrate 60 and TNT 40% with a comof pressed TNT pullers

Filler No 7. TNT 35. Am nitrate 50 and DNN 19%: make more as an extender for INT in name remunities. Pilter No 24. Cast P A ; was used as a bursting charge in some shells, as 'a standard burster and as a subbooster in mines when hi.F. was used as the initiator. Filler No 27, Fo 02 + Fo 10 (present); was used in AP shells and SAP

Filler No 28. THT/Was - 90/10 + PETN/Was -- 90/10. pressed in blocks in staminum containers; used in some

Filler No 29. Fp 10 Layers pressed in shall

Fp O2(cryscallized) Fp 10/XCI-"0/30 Fp 10/EC1-50/50

Note: Ref 3, p 286 gives for Fp 29 the following composition: Fp 10 + TMT (crystallised) + TMT/wax/EC1-63/7/30 TNT/wax/EC1-45/5/50 4 ECL: prepard in blocks in card board containers.

Filler No 30. Fp O2 + Fp 5, pressed in shells. Note: Same as under Piller No 12

Filler No 32. PETN/wax-90/ Filler No. 32. PETN/wax-90/- messed in wax paper; Filler No. 32. PETN/wax-85/97/ were used in A/T mines and as smadard sub-booscere in all kinds of annunities

Filler No 34. PETN/wax-76/30 was used as filler of special shells

Filler, No. 34. PETN/was-60/40; was used an filler of spēcial skella

Filler No 37. PETN/wax-50/50; used an above Filler No 38. PETN/wax-35/65; used as above

Filler No 7, PETN 91.5, wax 8:5%; was used as subbaceter in bomb gainer, in 80 min-CM shells and in some 30 mm and 37 mm shells

Filler No 7, PETN/wax-82/18; was used in 37 mm ADRN and APMB shalls .

Filler No 7: PETN/wan-87/13; was used in 56 me #Iller, No 7. PETN/wan-92/8 5 2%; was used in A/T

14.1 50 cm TH, 105 min HE How as a detenator surrenad in HE shells (50 and 75 mm) and in some 75 mm and and \$5 mm AP shells.

Filler No 42, Pentul (pressed); was used in HE shells. Filler He (41. Plautic explosive consisting see PETN and mineral cill was used in some HE shalle

Filler No 45. PETN/RDE-50/50, pine 30% was; similar in properties to PETN/wan-70/30; was used in some special projectiles. Asomer mixture commined ROM

50. PETN 35, and wen 13% " Filler No 32. An assetti-type explosive containing DHS 50, MH NO 35, and RDX 15%; yellow solid; could be cast; emplosive, properties similar to these of 50/50 ametal; toxic (due to the presence of DNB). Was used in 50 kg GP and SAP bembe. (Ref L: p 135). Filler No. S2c., 'An anniel-type explosive commining such Co nizuwi 30, Net NO., 55, RDR 138; was less powerful and briants than 50/50 Anniel but of about the name sensitivity. Was used as a hiscuit filling in the ness of parachute and sohet hombs, with a nurseund of Filler No 52a

Recomition Handbook (Ref 3, p 286) gives the following

papoeitians for Fillers No 52 and 52At-Filler No 12, Marrie DRB/Am airrass/RDX - 47/36/15 with a biscuit of Am nitrote /Ca nitrote/RDX/PETN/ Combined water - 46/21/20/9/4

Filler No 52A, Marrist DNB /Ass misente/RDX - 50/35/15. with a biscuit of Ass nimme/Ca nimme/RDX/PETN/ Combined water - 46/21/20/9/4

Filler No SZA. Herriz DNB/Am sirrere/RDX - 35/30/37. with a biscuit of Am nitrace/Ca aigrace/RDX/PETN/ Combined water - 46/21/20/9/4

Filler No 56 or Denorit .. Am nitrace 67-80. TNT 12-25. NG 3.8, collection cotton 0.2 and regetable ment 4%. it was a vellow, semi-plastic substance personning nearly the same explosive properties as 90/20 assess), except the it was slightly more sensitive to impact and rifle build terms it was used for filling some hand

greendes (Ref 1, p 90) -: Note: Ref 3, p 287 gives the following composition for Filler No 56, Am nitrate 80, TNT 12, NG 4 and tye flour 4% Filler No 57 or Abonochi? 2 . Am sizzare 64, K .or No mitrate 5: TNX I3, collection cotton 1, and Nauchiorage 19%: was used in some menades

Note: Ref 3, 'p 287 given the following composition for colledion cotton/charcosl - 64/3/14/17/1/L. This composition was called Monachit.

- Filler No ?- RDX 8, tech Ca nitrate 5, Am nitrate 55, EDB 30 and wax 2%, white substance:, said in some

ammunition (cast loaded), its explosive properties were comparable to 50/50 Amatol (Ref I, p 134) Filler No 60. Pressed TNCB; was used as a shell filler . Filler No 61. Cast TNCB; was used as above ...

Filler No 64. Cast-leaded mature of TNCB 60 and Am niusce 40%; white to brownish color, mp 81-82, partially sol in w. sol in alc and accone; explosive properties were similar to 40/60 Amatol; hygroscopic and namable, very toxic; was used as a shell filler (Ref.

Filler No 66, PETN/wax - 50/50

Filler No 76, Pressed TNB; was used in some primers Follow No 83. EDD in mixtures with nome HE, to permit

cast loading Filler No 84. EDD 55 and Am ustrate 945%; was used in name shells

Filler No. 84. EDD/RDX/Was - 46/18/36, pressed in blocks wrapped in wax paper and placed in an aluminum

Filler No ? (Fn 30/70). TNT 30 and Am nitrate 70%; was used in some A/P bombs'

Filler No ? (Fp 5/95); TNT 5 and Am nitrate, 95%; une is our known

Filler No BE (Fp 40/60), NH NO 60 and TNT 40%; was used is some shells provides and radio-guided Filler No. 80. General name of cast mixtures based on

RDY Filler No 90, General name of pressed mixtures based

on RDX Filler No 91-H5, RDX 95 and Montan was 55; was used

in sub-boosters and boosters ; Filler: No 92-H10, RDX 90 and Montan was 10%; was used in boosters Filler No. 7 (M. 10.3), RDX 89.7 and Montan was 10.3%;

was used in 75-pm AP shells. Filler No .? (M 3). RDX 97 and Nonian wax 355 was used in bobeters for tropical countries, to replace PETN/mak mirenes

Filler No 95 (H/Fn O2, SRDX 60 and TNT 40%; was used in some shells (press-loaded) Filler No -101 (Fp 15). INT/wax-85/15%; was used

is AP bombs. (Ref 2 gives for Filler 101, TNT 92 and Montes was 8%)
Filler No 102: Am nitrate 60, TNT 40% and some was:

uses not indicated

Filler Ma 104. RDX; unes cot indicated

Filler No. 105 (Trialen' 105). RDX 15, TNT 70 . and Al (powder) 15%; was used enst-loaded in GP bombs and torpedoes Another mixture contained TNT 74, auptholene 14 and Al 125

Filler No. 106 (Triples, 106) - RDX 25, TNT 50 and A1 25%; was used in some bombs

Filler No 107 (Triefen 107), RDX 20, TNT 50 and Al 30%; was used in underwater ammunition Filler No 108 (?) (Triselitel). RDX 20, TNT 60 and

Al 20; was used in underwater amountain Filler No. 109 (Trinies 109), RDX 70, Al 25 and Montag wax 5%; was used compressed in pellets, as a biscuit filling with NGu in the nose and as a surround for ; Filler No 106 (Triales 106) in the 500 kg GP, 1800 kg AP bombe and in some prioriess succest missiles,

Note: NGu was used as protection for Filler No 109, which alone is even more sensitive than straight RDX.
Filler Me 110. Am nitrate 90, Al 2.5, napthalene 5 and

wood meal 2.5%; light gray in color; required a secondary HE primer to detonate; was used, press-loaded in concrete and in A/P bombs

Filler No 111, Am attrace 90, carbon 6 and mineral matter 4%; was used press-loaded in some bombs. Note: Ref 3 y 288 given for Filter No 111 Am nitrate 96 and carbon 4%

Filler No 112. Am nitrate 80 and TNT 20%; was use in some bombs ta some pomps #iller No. 113. Am nitrate/TNT/Al powder = 70/20/10;

uses not indicated. Abbreviations: Ai Aluminum; aic sicohol; Am Anmonium

AP Armor-piercing; AP Antipersonnel; AT Antitank; CM Chemical mortar; DNN Dinitronaphthalene: EDD Ethylendiamine dinn.ate; GP General purpose; H Hexogen (RDX); HE High-explosive: HeC Hollow (shaped) charge; How Hewitzer; LA Lead szide; Life Lend styphaate; MB Monoblock; M F Mercuric fulminane; Mk Mark; NGo Nitroquanidine. P. A. Pactic acid; PETN Pentacythrital tetrantoste; RN Round none; RDX Cyclonice or Hexogen; SAP Semi armorpiercing; sel soluble; toch technical; TM Trench morrat; THE Trinitrobenzene; TNCB Trinitrochiorobenzene; TNT Trinitrosoluene; TNX Trinitroxylene; w water References: ...
1) Allied and Enemy Explosives, Aberdeen Proving Ground

Maryland (1946), pp 75, 79, 82, 86, 88, 97, 112, 113, 118, 120, 122, 124, 129, 133, 134, 137, 139, 142, 142 and 147 2) U.S Department of the Army Technical Manual TM 9-1985-5 (1953), pp 536-7

3) Anon, Recognition Handbook for German Amunatrion, Supreme Headquarence Affiled Expeditionary Force (1943), pp 286-8.

Fillers Used in Anticoncrete and Amer-Placeing Shells. In order to make the explosives such as TNT safe for use in groom piercing and anticoncrete shells.

nose werg made less sensitive to, shock by incorporating some was and K chloride.

A good example of this type of filling was the one in 210 mm Anticoncrete 'Shelf (21 cm GrRe)

its filler consisted of ten pressed pellets placed in cardboard container and held in position by a cement lining. The forward three a cement lining, the toward three sections 6, 7 and 8 were intended to provide protective layers, practically insensitive to shock whereas the layers close, to the base were nearly or just as admirive as straight TNT. The enclosed list gives the compositions and waishes of charges shows on the the enclosed drawing.

No 1: 4 lb. 2 oz of TNT/Vax - 94/6 No la 8 oz of Straight TNT

4 lb. % oz of TNT/Wax = 90/10 1 lb. 5% oz of Straight TNT . 5 1b, 5% oz of TNT/WAR - 90/10

5 lb. 4% oz of TNT/ Wax - 91, 9 4 lb. 2 oz of TNT/ Nam - 91/9

6 ps of TNY/Way/K chloride-60.5/5.4/34.1 5 oz of TNT/Wax/K chloride-44.1/5.6/50.3

No 8 6 oz of K chloride Total weight of filler was 25 th 82 oz

Reference: E. Englesburg, The Ordnance Sergeant, May 1944, p 320.

Firing or Ignitor Composition 121. One of the mixtures used during WWE: sulcon 25, Pb chromote 50, and K chlorate 25% [PB Repc 95.613 (1947), Section U].

Finnenhamba. As incendiary bomb containing as oil mirrure/ and a HE busning charge. The following types are described in TM 9-1985-2 (1953), pp 52-54:

a) Flam C 250 A (B or C) contained 50 kg of oil inconducy mixture and TNT burning charge (p 52)

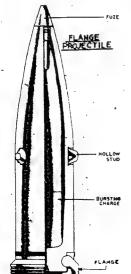
b) Flom KC 750; same filling as above (p 53) c) Flom C 500 contained the incendiary oil consuming:

c) Flam C 500 contained the incendiary oil consulting of 70% percoleum and 30% TNT, with TNT bursting charge (p 54).

(See also incendiary Bombs, Brandbomben and Sprengbombse). (Illustrations are given under Bombs),

Plemenbility Test (Entsündlichkeitsprobe). A special apparatus called "Flammenpendel" and its application to testing of various explosives and proprechnic compositions was described by P.Leass 3 5 27, 36-68 (1932).

Flumenessation of Flume Reduction of Flume Reductio



Floresheeschess (Flange Projectile), called also "Squeeschore", or "Littlejohn"was a subcaliber projectile provided with a flange and three hollow scuds as shown on Figure and described in the TM 9-1987-3, p 360-

It was fired from a cylindrical railed barrel to which a smooth-bored, tapered mazzle extention was attached.

The principal advantage of the "Ihange" projectile in comparison the when subcalabler projectiles was that it was part of the properties was the properties of the part of the decarded, because the bollow settle and the filings were easily depressed when the projectile passed from the rilled section of the gun to the samaller calibes smooth bow extression.

(Compare with Arrowhead Projectile, Arrow or Needle Projectile, Distategrating Band Projectile, Rochling Projectile, Sabot Projectile and Tapered Bore Projectile)

Flow (Lauchtugal low Fachel). A Genom flate usually consusted of a cylindrical cofinators bosting an illuminating element, those being ignized by a pull firties ignizer or since face the flate based by a great containing element. The illuminating element consisted earlier of a ningle or a multiple candle una which wared in intensity of illumination and color. Flates were made with our warshurer.

A brief description of the following flures in given in TM 9-1985-2 (1953), pp 65-81:

3) LC 10 (Levcker) indexach 10) consisted of an aluminum cyfinder, a single candle in a cardboard liner, an "69" clockwork fuse and a parachuse locked in the tast and. The flare was dropped from a plane and at a predaternihed time the luse litted and ejected the candle and in parachuse from the body. Simultaneously the candle was iguard (p 50).

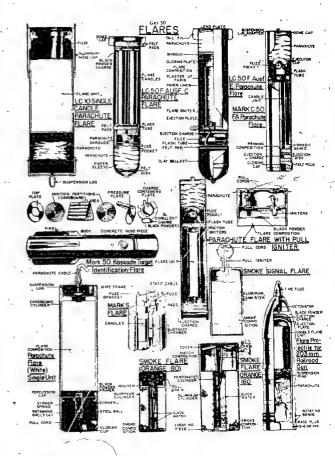
2) FB 30, Sargie Candie Parachuve Flare (p 66)

J C 50F Audi C Parachuve Flare consisted of an aluminum orilindrical body with done-shaped nose anatached by means of brase servers. On telesaing the anatached by means of brase servers. On telesaing the ignited. This fixed the quickmetch, which is turn burned towards the final turn and spiried the black powder charge lights teal. The pressure of the gases developed by the defligacing black powder, caused all four lifest the property of the servers of the servers of the pressure of the pases developed the servers of the se

(p 68-9)
5) LC 50F Auci G, Single Caudle Parachuse Flate
(pp 69-70)

6) Merk C 50 F/A Purchuse Flare consisted of a cylindrical siminum housing consisting a purchus, fuze, quicknatch, single candle unit, linsh tube, printige composition and ejection of link. When the flare was the contract of the contra

7) Mark '50 Kwakesia Targe: Indicating Flare consused of a three next cylindrical constituer I. 7- diam and 41.0° long containing £2 flares [in three layers separated by perforated cardboard partitions), an expelling charge of bick: powder, smokelean propellant ignition disks and an igniter (luse) assembly, A heavy concrew nose was provided to make the missile fall with the nose downwards, when released floor a plane. As the missile fell, the expelling charge was ignited three systems fell, the expelling charge was ignited three systems fell, the flares (condies). At the same "no by propellent



Am nitrate 40%.

References

ignition dieks ignited each capile. (Composition condier in given under Pyrosechairs [ See also BIOS Rept 1233 (1946), p 1 ] Rept 1235 (1946, p 1 1)

Single Goodle Panachure Flore with Pull Igniter
was similar in construction to the Morit COSPA limes.
The principal difference was thus the canade was reversed read ignized by pull (friction) igniters instead
from the micraft, the fear (though the micraft of
from the nicraft, the fear (though the micraft of
figured the spectrum charge of high terminated the

presume of the gases ejected the parachute and the presume of the game s specued the parachure and the candle threefil the near. At the same size the parachure pulled the cords of the igniture, which, were particular with delay elements of 30 year. The candle was then ignized and humed for 3 minutes (5p. 12-5). Singly Conditional 3 Singly Condition Unit Practices Flaur (Phins) consistent of a symbolecula shankson -body children and state of a symbolecula shankson -body children and state to a parachuse by meant of a child. Eight should line

to a parachete my means or a case. Diget annound these terminated in a loop which was in term strached to the pull cord of the igniter, On relatating the flam, the parachete arbitred a pull on the igniter %31" fixing cord than releasing the striker spring. Then the surker his the personies cap ignizing the him's possion primer

ned the candle (bp 74-5)
10) Single Candle Perachus Flavon; I (White) and
I (Red) (pp 75-7)
11) Men S Flavon, Types I and I reasined on cylindrical
11) Men S Flavon, Types I and I reasined an address Ye 11 June 3 Piares, 179es 1 nes a renatores en symboles me bespesor, chamber which contained two condition? To these were accorded a fear, a static send, and as pull-limiter. The motic coel heartined either the sendar-derings of the feare or the pull lighter. When, the device. was released (from a container) over the waser is west was reseased trees a container; over me weeke it. Freed based the surface and then cues top. It fleened with the head of the fleer just close of the wasset, This it is a contained to the wasset. This is in cased was about to be based one, a pains of anday free tunning to the 2nd credit; wen Ignized and, where it share they the 2nd credit; were Ignized and, where it share they; the 2nd credit proved to beam. But it is a contained to be the contained to be a c

condic berned for shout 2% min (p 77-0)
12) Sanke Flares; Crange 160 and Crange 80 week need as wind drift indicators (so 79-80) 13) Sante Signal Flore, used so navigation aids by

pilots (p. 80) - 14) Smoke, Simul Flare ARDR was wood for the sum

purpose se above (p 80) 15) Dimmens Signal Torch readleand of a narrow above aluminum cylinder containing there pounded charges of fire compositions which bessed respectively sed. white and red. The compositions were ignised by a

pull igniedr (p. 81) 163 Germal Flare, Badanlauebes (P) P186 217 is briefly described in BIOS Final Report 1733 (1946), p 2 see the composition of the fluse is given under Pyromechaies. In addition to flusse diopped from planes, there were

nome flores fixed from guan, e.g. the Flate Projectile for the 203 mm Railway Gus (20.3 to Loseltgrosses) described in TM 9-1985-5 (1953), pp 519-20. The she was conventional is design except that it had to ad ditional bourselet machined near the middle of the abs body. The weight of the shell was 2264 lb, that of the flare tandle 'unit' and parachuse assembly 47 lb, and of the expelling charge (black powder) ½ lb. The flare and parachuse were expelled through the base of the shell.

Flesh Reduction in Propollents (Mindungsfauervermindung oder Missiangsfewerdimpfung), in order to reduce the flank produced on combustion of propellants, the Germans for meny years used the salts of potassium, such as K sulfate K pitrate, or K oxelete. The investigation conducted before WW Is has shown that of the inorganic compounds the birst flash reducers bre the alkali salts and that finablessanens is improved on soing up the series in the Percodic System. (Ce is better then Rb and Rb is better then K).

The inormanic flash reducers (such as K sulfers) were usually loaded in small bags separately from the propellant.

and placed between the projectile and the propellane. These anti-flash bean, called in Gorman "Vorlage", consisted of two perforated discs of artificial silk or cores cloth newed together in the form of "doughtern" and filled with coarnely pulverized K sulface. (Ref 1, p 324).

Another flash reducer consisted of a large bag with avalle acid and a small beg with pornssium oxalate.

. With the incorporation during WWE of ninomanidine (NGu) in some propullants (now Gudelpulver), it was found that NGs alone gave sufficient flashlessess without incorporating any of the usual fleak reducing agence, he propellants, which did not contain NGs, flashlessesses could be successfully achieved by using a small bag with

NGu and a small bag with K nitrate.
It should be noted than the use of inset (mon-explosive and non-combustible) flanh reducers such as K sulfato. sitrate; or exalare, sunlic, sold etc, is always bound to decrease the ballistic potential of the propullant ned their use in large amounts should be avoided. This does not apply to NGs because this compound in not have but is MGs may be used, either directly incorporated in a powder."

or used in a separate bear The following German flush reductants were manifed

Picuriney, Arsensi (Ref 3) ducing WV E: a) Potassium chincide; was used in 76.2 mm AP weape h) Potentium sulfate; was used in 7.92 Bell, :20 me APHY, 20 me inc. 20 mm HE binner, 30 mm Salach 37 mm APHY, 37 mm APHY, 37 mm APMB, 37 mm NE. 50 mm HE; 75 mm AP; 75 mm HE and 100 mm K18

A Sellen bicochanner, was used in some 50 mm AP

4) Sedium sulfate: was used in some 75 um ME must. According to Rel.4 the following compounds were ex-

command real title returning compositions where committeed in the Discherg Parkit Dynamit A - G as possible flash reducers (Plansmoddingfor):
Aminogramidian Mutathonian Aminocrans, Am phosphane, Am rudiane, appeting, asteroom, Be suffere, becam hitself-cations called, cryoline, disposal matched, disrepard moments. cacion oxide, cryolice, dispondiumore, america commer-dimethyl mee, discolium phosphare, more usus nicensi-methylene mea, K bicarbonece, K chloride, K jodide, K meraphosphase, K parchlorate, K phosphase, K silico-ellucide, K mea oxalize, sodium ammenium sulfequ-

sulfur, nine sulfate and Zr emide.
It was claimed that methylene uses reduced the flock to a far pumber excess than any of the organic compounds uneta: k was also exceed that carious sales were much more effective than any other nortallic sales investigated (Mel 5). Abbreviations: AP. Armorphicsing: HE high-explosive; HV Hyper velocity; MB Monoblock: for incendiary.

Padespaces: 12 1) Davie (1943), p 324: 2) O.W.Scickland or ul. General ... mency of Emplosives Piners, PB Rope 925 (1945), Appendie H 3) Picatimy Arsenal Tech Rept 1555 (1945), p 31 41 A.A.Swanson & D.D.Sager, ClOS Rept 29'24 (1946), p 6 5) CIOS 29-24 (1946), » 6. ·

Flash Reduction in Protection, then it was required by the German High Command to have un AA (Flah) projectile whose explosive flash is penetically lavisible in the misks sky, the Krummel Fabrik A.-G satisfied the requirement in the following manner: The high explosive filling was completely entropy

with a 5 - 6 mm thick layer (shouth) of chioring arom containing material such as retrachloro- or hexachlorouspitchelene or Am chilorade.

Reference: PH Rept 925 (1945), Appendix 7.

Pluchtlakeit (Volatility). The determination of volatility of auntonium is described in the analytical section.

Fluorino and Fluoridas, See general section. The methods of manufacture, as practiced at the IG F-arbeniadustrie places at Leverkusen and Oppau, are briefly described in BIOS Final Rept 1595 (1951).

Fillippine Tel (Liquid TNT). See Drap Oil in the general section and Tropfol in the book by Stampacher, Schlessand Sprengstorie (1933), p 240.

Plistingleftenemanteffe (Liquid Air Explosives, Oxyliquit). See depoted section.

Fast Acid (Smoke-Screen Agent). See Nebelphure.

File Gorlit. File RZ 73 . See RZ 73 Föho and TM 9-1985-2 (1953), p 235.

Fördit (Foordite), According to Nacom, Nitroslyceria. Baltimore (1928), pp 407, 411, Fourdites were permissible gelatin-dynamites manufd after WWI. Their composition is aiven in Table 16.

	1	2	
C-i		signation	
Components and properties	Fordit ?	Fordiz 1	Fördit 4
Am aitrace	41.0	37.0	38,0
NG (aitroglyceria)	25.0	25.5	21.0
Colled cotton	1.0	1.5	1.0
MRT (menonitrotoluene)	3.5	5.0	5.0
Glyceria	₹8.7	3.0	`3.0
Cereal or potate flour	-		12.0
K chloride	. 22.0	24:0	19.0
As oxalate	- 1		1.0
Bolas (chian clay)	0.1	- 1	
Demria	0.7	4.0	· •
Onygen Belence, %	1.0		-19.5
Trauxl Test value, cc			220

Farmit (Formite). One of the Ersensprengutoffs developed during WWE by an explosive group under the direction of Dr. Hone Walter, It was obtained by heating a mintage of 30% commercial formaldehyde and NH NO (in the ratio 6 mois HCHO to 8 mole NH NO ) under reliating about 1 hour, followed by wacaum distillation to remove the water and careacted formaldehyde. The residue was a faintly yellow composition which consisted of MAN Sala 25 to 30, TRI-Sain 1 to 3 and Am mitrate 67 to 74%. Ica calorific value was 900 kcal/kg and volume of gasts pro-duced on emplosion 1050 l/kg (calculated at 0° and 760 mm Hal. When about 15% of RDX for PETN was incorporated. the velocity of detonation was increased appreciably and the brisance was increased to that of TNT, while the volume of sases evolved on explosion was higher than for TNT. This explosive could be cass-loaded sesting point about 90"1 in projectiles but un fortunately is exuded at, 60-70 le was fauly stable to heat, provided no iron imputities Were Devent.

References: 1) H. Walter et al, German Developments in High Explosives, PB Rept No 78,271 (1947), p 4; 2) A.LeRoux. Mem Poud, 34, 132 (1952).

Four-Carridge Test, designed to determine the ability of mining explosives to transmit detonation, called in German Detentionsfishighet Frede, was conducted as

Four carridges . 35 mm in diameter, were laid and to end on a bed of sard and one side of the train was detonated by a No 3 blasting cap. It was required that all four canridges be detonated completely. Reference: BIOS Final Rept 1766 (1947), p 2.

Fo (Rullpuiver) Any explosive used for filling shells. bombis, etc. .

Fp 60/40 (Fillipulver 60/40 Amatol containing TNT 60 and

Fp 02 (Fullpulver O2): Explosive, pattern 1902 (TNT)

Fp. 88 '(Füllpulver B8). Explosive, pattern 1888 (P. A.).

Fraumont Density Test, Fragment Concentration Test or Density of Splinters Test (Splitterdichteprobe). A series of investigations were conducted during WWE by the German Ordnance Dept (Vaffenant), under the direction of De G. Romer in order to determine the relation between effective. tragment (splinter) weight, fragment velocity, fragment number and fragment range (distance of travel) and the weight and type of the explosive material; as well as the type and thickness of steel used in ammunition. These costs were conducted with a view to designing the most effective ammunition. One of the tests used for this purpose was the fragment density test (density of fragment test), which was conducted in the following manner:

A shell containing an explosive to be tested was detonated while susrounded with wooden boards 2,cm thick. The number of fragments per square meter piercing the boards was counted and the average distance at which there would be one fragment per: so m was calculated from a apecially constructed curve. In order to obrain reliable results it was necessary to decesse at least

Following are some values for the average diseases to obtain one penetration but square meter using a 105 mm shellt .

TNT 39-40 m, 40/60 - Amatol 38-39 m, 50/50 - Amatol 35 m. 60/40 - Ametol 34 m. 50/50 - TNT/NeCl 26 m and 40/60 - TNT/NaCl 25 m.

Note: As this method was expensive and time consuming. the Krimmel Factory of Dynamic A-G proposed loading an iron tube with an explosive to be tested and to detonate it on lead. No details of the last method were given,

11 O. W. Srickland et al. General Summary of Explosive Plants. PB Rept No 925 (1945), Appendix 7 2) G.Römer, PBL Rept #5 160 (1946) and private communication Dec 12, 1953.

Friction Type Jeniter (Brenn zünder), See under leniter.

Friedler of Halberstadt in 1893 parented an incendiary composition which burst into fisme on contact with water It consisted of metallic sodium or potassium incorporated in a mass of crude rubber. The mixture was loaded in thin walled projectiles which being lighter than water floated on its surface ( Daniel Dictionnaire (1902), p 310 ).

Fritsche Zündschner (Fritsche's Fuse), A core consisting of a pressed mixture of K nitrate 63, alderwood charcoal, (Establishments) 13, and pulverized sulfur 24% enclosedin a fabric tube. It was slow-burning, [A.Stut-bacher, Speeng- und Schassatoffe, Zürich (1948), p. 107],

F-Seeff (Timmlum Terrachloride). Sor gannel section; wan Berlin (1936), pp 161-66ened as a smoon-producing agent.

"Punt Dil fgettene (Dienel Ignitern) were sticks of road 4" x 14" x 140" which were dipped, first in occome-callulate solution and then in the following pyrotochate mixture: Al .30.6, Be nitrate 26.3, . K nitrate 23.0, S 5.0 and gam 6.9%. In order to make the match friction sensitive, one and of the stick was coated by disping it into a mixture coarnining K chlorete 66.9, Fe maide 14.9, pawdated sless 6.0 and gum 12.2%.

"glans' 6.0 and gem 12.2%. Og" satisfies, there igniters, bassed florenly, it is believed that they were used for igniting fuel all in power Reference: T.M.Bennett, BIOS Finel Rent, 1313 (1947), ...

Fillouivir (Fp) adm Filling (Filler or Filling Explosive). San Filler

Palinuffe (Filling Micerials). Non-emplosive majorials, restreeme triting perceising read-unpersive motorities and such as NaCl, chalk, etc., incorporated in dynamics and mathematically companition, either, to, change, she character-igion of explosives (such as to make them less brimes) on to occasable on the amount of NG, TNT, etc.

Dynamies containing Fillesoffe were called Se-strainte Dynamite (Stretched dynamics) [Noom, Schicesand Seemanteffe (1927), p 100,

Fulnanit "(Fulnenite). Fulnenites were Faviar-true exphonium such ant a) An airmay \$6.5, perceives 4, TMT 5.5, perceive ail 2.5 and charces 1.5% (Ref 1), b) Am airmay \$2.5, guaratten 4, THT 11, charged 1.3, and parallis all 1% (Bef 2): References:

1) Marshall, v 1 (1917), p 391 2) E.Bernett, Explosives. Van Neemad, N Y (1919), p 113.

Fulnismen Scott (Falminating Compound Under this name, Southacher, Sprong und Schiesoueffe (1948), 10-114. lists the following subsumces: Jedstickscoff, (Microgen indice), Kanilaither van Berreller (Fulmisseing nilver of Bestelles), Natrodianebenselperchlerat (Nitrodianebenneneperchisente) and Knulleilber (Silver falminate).

. The initiating compounds, such as MF, LA, and L St . ace lined in the name book sh Zundstoffe.

Fulminatio As explosive proposed by Fuchs of Silesia: NG 58, and wool shearings (clippings) 32% [ L.Gody, Truité des Matières Explosives, Namer (1907), p 359 7.

Pointnetrebour Fulminate Fare) is a demonstra fuse which has a odre of mercuric fulminary descentified with paraffin Its velocity of deconation is 5300 m/sec. [ A.Stexbacher, Spreag and Schiesstoffe, Zurich (1948), p 107 ].

Funkanahranagruph (Spark Chronograph). See Chronographs in the peneral section.

Punkensinder | Spork Inniter or Primer (Electric) Devices ? such as Bornhaudt's are described in Benling-Drakopf (1930. p 216.

Furtural Aluskul was used to initiate the combustion o gasoline at the moment of its coming in contact with mixed auxic-aulfuric acid; called SV-Stoff in Germany (CROS 30-115, r il).

Fuse (Ziladechner oder Zeitzflader). See genemi section and also Beyling-Drekopl, Sprengutoffe und Zündmittel,

Punt (Ohnolete), Daniel, Dictionnaire des Macières Enplonives (1902) described a fuse called "mache allomande (German fune). It consisted of a surip of paper improgramed with sulfur and saltparer, then dried and incented in a paper tube containing a small amount of flag grain black powder. The enzembre was placed in a bere-hole, in the of a carriage of a blusting explosive. After igniting the atrin of paper, the operator took cover.

Fung. Salety (Sicherheitsnundschutt). See under Fusen in the preem nection.

Fundamed in the combination of bridge wire, innited bond (drap) and lead-in wiren, le is a companent of elecuic primers and detenators [ BIOS . Final Rept 833, Item 2. » A3/27 ]

Note: In ClOS Report 24-3, p 7 the seest combination is called "Electric Match Head".

Fundand "A4" Low-consist fundand introduced during WI as a subscitute for basebend 63" after it became difficult to obtain the cerium-magnetism metals accessary for the preparation of Mirchmentil (mixed most) and of the general ingredients of "GS".

The" A6" were prepd at Trainder! Fabrik by dipping the sin of a bridge wire (called also fuse) successively lase) the following liquid compositions:

a) lat die which consisted of day Ph picross 90g and nilicon (20 to.-60 micross) 10g, all suspended in about 75 ml of a 2% solution of NC in anyl or buryl ocease. The conting was then deted

b) 2nd dip which consisted of dry Ph-picrate 50n. Ph chromate 35g and silice (20 to 40 micross) 15g, ali purposeded in about 75 mired 3% solution of HC in appl or busyl accence. The coating was uguin dried

c) Ard din which was it located consisting of a 15% solution of NC in 75/23 butyl accents/ethanel, to which was added (20% day weight of NC) Signific AOM, which in the methyleveloheryl actor of adjaic acid -

d) 4th dip was the same as the 3rd, but it contain C.Rr of Sudan Brown per such 101 of lecquer.

Note: Soldering of fuse wires to-lead-in wires, proparation of the dry ingredients for functionals dies, preparation of NC Incures and the process of dipping the function combe are described under Funcheed Manufacture. Reference: BIOS Final Report \$33, Item 2 (1946), p A3/35.

Payahand Comb A new type of fusehead suitible for machanical production was developed during WWR at Traindoct. Ir consisted of a strip of sheet steel from which the oneline of a comb was stamped. The two legs of each fusehead were then bonded together with Mippinn, the tips of the touth animably bear and the bridge wire soldered into posttion. After divolag the bridge wires has fusehead compositions, the back of the comb was absenced off [ 8105 Final Report No \$35, form 2, London, (1946), n A3/363.

Fundamed "G 3", Now tention functionals used in matern delay detonators were prepared at Traindorf Fabrile by distains the tip of the "bridge wire" (feee) successively

in the following liquid compositions:

a) Let dip which consisted of 77g dry lead-picture
18.5g cerius—negoesium—mixture (Mischmetnil) and . 4.5g siderwood charcoal, all suspended in about 75 ml of a 2% solu of NC in ampl, or buryl accesses. The comthe was dried

b) 2nd dip, which contained 43.7g lead picrove, 25g, aluminum (prepd by crushing Al foil to a particle size of 10 to 20 microns), 25g cerium-magnesium and 6.25g alderwood, all suspended in 75ml or a 3% sols of NC influent, or butyl accrate

c) 3rd dip which was a lacquer consisting of a 15% volution of NC in butyl acetate/athanol-75/25, to which was added (20% of the dry weight of NC) Sipalin AOM. , which is the methylcyclohexyl ester of adipic acid. This lacquer was fairly impermeable to mointure and cracked less readily than straight NC lacquers.

d) 4th die which consisted of the 3rd die to which was added 0.8g of Sudan Brown dye for each 10 | of lacquer). Europeada made with G3', composition developed heat amounting to 580 cal/g, the pressure developed by 1g was 880 acm and the volume of gases 190 cm3 per g at NTP The disadvantage of G3 was its bygrosopicity which made it quetable la storage. References:

1) BIOS Final Report \$33, Iren 2 (1946), p A3/34 2) PB Rept 95,613 (1947) Section D.

. Fundand Manufacture. The bridge wire ("fuse") mide from an alloy 80/20-Ni/Ce, (or 60/15/17/7/1-Ni/Ce/Fe/Mo/Mn) was soldered to two lead-in wires (made of soft from 0.60 mm in diameter) by means of a 60/40-Sa/Ph solder and Za chloride flux. The wires were coated with a 0.25 mm layer of Mipolam. Without cleaning the flux from solder, the tip of the fusehead (heidre wire) was divord into an ignited composition, such as fusebead composition A6, fusebead composition G3, Spale, or Marspille. Each fuschend required four dips which were conducted as follows:

A number of funcheed assemblies were inserted in a special frame placed over a pan containing an appropriate dip mixture, and the frame lowered until the tips of the fuseheads were immersed in the liquid (dip). Then the frame was removed from the dip; turned upside down and slowly moved (with the fuseheads uppermost) through a semi-circle for 15-30 seconds. After thin, the frame was hung by the handles from cleate affixed to endless chains leading to drying tunnels The tunnels were about 50 feet long and were heated by steam from below the bottom platen. The 2nd, 3rd and the dips were conducted in the same manner as the lat out. After being dipped and dried, the fuscheads were graded for remistance, using a special automatic was 1.0 to 2.4 ohms and they were kraded in ten steps; 1.0 to 1.2, 1.2 to 1.4 ...... 2.2 to 2.4. For high tension funchends (nuch as "Spalt"), the usual resistance tunne was 3,000 to 15,000 ohms but the upper limit was not specified because it was found that fundingeds of 100,000 ohms, or even more, functioned satisfactorily.

a) Preparation of dry ingredients for funchead dips. The dry ingredients for fusebead dips, with the exception of Mischmetall, were usually mixed behind a barricade in a graphited, papier muché drum, 6" diameter and 10" lone. provided with an aluminum lid. The drum was rotated at

14 spin, Six No 6 soft rubber stoppers were placed insidthe draw to aid mixing.

The Mischmetall was considered to be too inflammable to min in the dry sence with the other ingredients and was always added separetely after the other ingredients had been sided to the NC varnishes. (The Mischmetally was previously pulverized by grinding it under sylol in a small ball mill. Then the zylol was decauted and the alutry was transferred to filter paper on a funnel, where it was

washed with bearene, spread on trays and dried :

b) Preparation of NC varnishes for Inscheads, Before 1943, amyl accente was used as the solvent but when it became unavailable, butyl scelate had to be used aithough the workers objected to it because it affected their breathing even more than amyl acetare

Two grades of NC were used for the preparation of funcheads E 620 and E 1160 (N content was not given) and both of them were received at the fusebead factory wet with about 30% ethanol

The preparation of the watnish consisted in a thorough blending of the alcoholic NC with the desired amount of of butyl acctate in an iron drum provided with a wooden naddte stirrer

c)"Mixing of the dry ingredients with NC varnish, A slightly smaller amount of NC varnish than required by the formulation was measured into an 8" diameter "Pollopas" plastic bowl. and the dry ingredients were alonly added while continuelly stirring with a wooden spatule. Any Mischmetall required was then stirred together with the remainder of the NC varnish. The dip was thoroughly mixed by hand, using a wooden sparula, for at least one-half hour. The viscosity of the dip was then measured and if it wall too high, it

was reduced by adding small quantities of buyl scorace. 1) R.Ashcroft et al. Investigation of German Commercial Explosives Industry , BIOS Final Report No 855, StampNo 2, London, H M Stationery Office (1946), Appendix A5, p.27 2) Anon, Manufacture of German Deconators and Deconating Compositions, PB Rept. No 95,613 (1947), Section D.

FUZE (Zünder) German junes may be subdivided into Bomb Fuxes and Projectile Fuxes. The first group was used in agrial bombs, some booby traps and in some pyrotechnic devices and the second group is shells and A. Bone Fuze (Bombenzinder). The Germans employed

both mechanical and electrical bomb fuxes. The mechanical types were used in smaller bombe (such as 2 kg, 12/kg and 50 kg) and in some hooby traps, whereas the electrical fuzes (developed and manufactured by the Rheinmetall-Bornic Co) were used in all kinds of HE bombs and in flares. Among the electrical fases was the "proximity fuse", type 6 used in incendiary bombs C 250 Fism and According to Ref 1 there were ten basic types

Mechanical Impact and flare fuzzes; used in Z ka

Butterfly bombs and 2 & 4 candle flares-

No second Mechanical impact fuze; used in 12 kg A/P bomb

Mechanical impact fuze; used in SC 2500 bomb Impact fixe: instantaneous of short delay; (lamitarets): used in HE (SC of SD) bombs Proximity fuxe; used in C 250 and C 500 Flam Sombe

Long delay time bomb fuze; used in HE bombs impact fuzz (sea targets) with slight delay to effect detonation at some depth below the surface used in HE (SC or SD) bombs

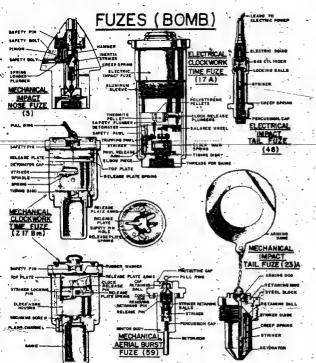
9 Aerial burst (short rime) luxe, used in parachute flares and photoflash bombs 10 "Protective luze; used in hooby traps and SC 250

& 500 ke bombs. Fach of the above heart types extered in one or several ariations. The following chart, based on the information obtained from Refs 2 and 4, lists these variations ac-

cording to their numerical designations:

1) Mech Imp Nose Fs (3) AZC 10 (Hot;\*, Type 3 used in SC 12 kg A/P bomb (Ref 4, p 134)

2) (5) Elec Fuze was forerunner of Type ) fuses, but is now obsolete. The A variety was manufed in Spain (Ref 1,



File No 2321.5)

3) Elec Short Time Assial Burst Fz ElZtZ (9) or (9)\*
used in paracture flares and photoflash and gas bombs
(Ref 4, p 167)

4) Elec Imp Fz ElAZ (25), or ElAZ C 50 (15) (obsolete) was used in SC 50 to 2500 kg, SD 50 to 1400 kg and SBs 50 kg bombs (Ref Z, file 2321.5 and Ref 4, p 139)

5) Elec Mach Long Delay Time Fx ElAZ (17) Time 2

30 Elec Mech Long Delay Time Fs ElAZ (17), Type 7, used in SC 250 and 500 kg bombs having two pockets (Ref 4, p. 352)

for Elec Mech Time Fz EfAz: (17) A, ElAZ (17) A\*, ElAZ (17) B\* unced in the mass-bombs as ElAZ (17) Res-4, p. 204;

7) Mech Time Fz Z 17 Bm used in SC 500 & 1000 kg,

PC 1000 kg sad 858 1000 kg bombs and Hz 293 flying
bomb (Ref 4, 155)

B) Mech Imp Tail Fz (23)A weed in Brand 10 kg, NB 2 kg and SG 3 kg bombs, as well as in single unit parachute flares (Ref 4, p 134)

9) Mech lmp and Actibreak-up Fz (24) and (24fA used in the forward pocket of SC 2500 bomb (Ref 4, pp 135-8) (See a brief description under Antibreak-up Fuzes)

(See a brief description under Antibreak-up Fuzes)

10) Elec lusp Fu ElAC (25), (25) A, (25) A\* & (25) A\*\*
used in HE bombs (Ref 4, p 140)

11) Elec lusp Fu ElAC (25) B, 25 B, (25) C & (25) D used

11) Elec lesp Fx ElAZ (25) B, 25 B, (25) C & (25) D used in SC 50 to 500 kg and some far bombs (Ref 4, pp 141-2) 12) Elec Proximity on Imp Fx, Special ElAZ (26) used in Inc bomb KC 250 "Flam" (Ref 4, p 144)

13) Elec imp Fs EIAZ (28)A used in HE bombs SC 50 to 2300 kg and Inc bomb C 250 (Ref 4, p 165)

60 2700 kg and inc bemb C 270 (Kel 4, p 165) 14). Elec Imp Fs EIAZ 28 (\*) or EIAZ C 50 28 (\*) used is HE bombs (Ref 4, p 162)

15) Elec Imp Fa ELAZ. (28) B used in SC bombs against see targets (Ref 4, p 163) 16) Elec Imp Fa ELAZ. (28) B<sup>R</sup>, (28) B<sup>R</sup> & (28) B<sup>0.7</sup> used in HE bombs (Ref 4, pp 163-4).

17) Nech Actial Burst Fz (29) used in LC 10f parachute flore (Ref 4, p 168)

 Elec Imp Fs EIAZ (35) used in HE and AP hombe (Ref 4, p 142)

19) Elec Imp Fz ElAZ (38), (38umg) & (38u) used in HE bombs (Ref 4, pp 167-6) 20) Elec Imp Fz ElAZ (38 4) used in SC 250 kg bombs when employed as depth charges against U-boats (Ref 4, - 166)

21) Elec Imp Fz ElAZ (38)B & (38)C used in FX (400 and HE boshe (Ref 4, pp 166-7)
22) Mech. Annivibidaysmell Device ZuzZ 40, Types I, II & III used in SC 250 & 300 kg bombs under (uzes (17), C17)A ovi(17)B (Ref. 4, pp 137-81)Xes a brief description

(17) A or (17) B (Ref. 4, pp 1,77-B1)(See a brief description under Antiwithdrawal Fuzzes)
23) Mach Imp Fz AZ 41 or 34-41 used in SD 2A "Butterfily" bomb (Ref. 4, p 1,32)

24) Mec Imp or Aerial Burnt Fz "AZ (41) A cot" was used in SD 2B "Burterfly" bomb (Ref 4, p 132)
25) Elec Imp Fz ElAZ (45); uses are unknown (Ref 4, p 142)

p 142)
26) Elec Imp Fz ELAZ (45) A used in SC 50 bombs (Ref 4, p 142)

Electrically Armed Mech Imp Tail Fr AZ (46) used in KC 50 gas bombs (Ref 4, p 145)
 Rocket Bomb Fr Assemblies (49) A & (49) B, Type 9

20) Rocket Bomb Fx Assembly (49)A & (49)A, 1976 y used in PC 500RS, 1000RS bombs and 1800 kg "Erdstuka" (Ref 2, file 2324.92 & 4, p 169)
29) Rocket Bomb, Fx Assembly (49)C used in PC 1800RS

(Ref 4, p 170)
30) Elec Assidisaurbance Fz 50 and (50) used in SC. 250 and 300 kg bomba in conjunction with fuzes (17), (17) A or (17) B (Ref 4, pp 481-3)
31) Elec Antidisaurbance Fz 30b q "Y" (See under Anti-

31) Elec Antidisturbance Fz 50b og "Y" (See under Antidisturbance Fuxes) weed in HE bombs alone, or in conjunction with other Rheinmetall fuxes (Ref 4, p. 184) 32) Elec Imp Fz ElAZ C50 (5) (obsolute) & C/50 (15) used in HE bombs (Ref 4, p. 189)

33) Elec Imp I-z ElAZ (55)(tp), (55)A/M & (55)A\* tend in SL & SB and other bombs requiring instantaneous

m action (Rat 4, pp .43-4)

34) Eleg Chemical Time Fx ElAZ, (57) used in "Staba" bumbs (Ref 4, p 1)7",
35) Mech Aerist Build Fx (59) used in single & four

candle parachute flares and BIC, 50 photoffash bombs (Ref 4, p. 1-1).

30) Elec Aerial Burst 1 z 59A h 459) A used in A/P and inc continuers (Ref 4, p. 172).

37) Elec Aerial Burst Fz (59)B used in some HE bombs and parachute flares (Ref 4, p'172)
38) Mech Aerial Burst Fz Z 60 used in supply dropping

containers (Ref 4, p 186)

39) Special Imp Fz Z66 used in SD 10A bomb (Ref 4, p 146)

40) Mech Time Fz AZ (67) Zeit used in SD, 2B "Butterfly"

bomb. It was locked centrally in the upper longitudinal surface of the bomb (Ric 4, p 159) 41) Mech Time Fx 67/V used in Mk Ab 7: container to ignite 2 of the 5 candle units housed in the Novamer (Ric 4, p 160)

42) Elec Actial Burer Fs. Pyrotechnic Delay 69C ff. 69D & 69E (Ref 4, p. 173) used in AB 36, 250, 400 & 100 and BDC in comminers 43) Chem Mech Long Delay and Antidisturbance Fs.

43) Chem Mech Long Delay and Antidisturbance Fs (70) A used in SD 2B bomb (Ref 4, p 187) 44) Mech Antidisturbance Fs (70) B & (70) B/1 maed in SD 2B bomb (Ref 4, p 187) 45) Modified Mech Antidisturbance Fs (70) B umg used

45 Modified, Mech Antidisturbance Fz (70) B umg used in aircraft rowed paravana bomb (Ref 4, p. 188) 46) Elea Aeria Burst Fz, Pyrotechnic Delay ElZzZ 73, (79) & (79) A ward in parachute flares, SC 250 & 500 bombs. AP & lac containers and boxofilash bomb

(Ref 4, p 174)
47) Mech Imp"All-Veys" Action Fz. VZ (80) used in Ha 293
flying bomb (Ref 4, p 189)

19) Ditto VZ (60) A used in V-1 flying bomb (Ref 4, p. 190) of 49) Mech Avrial Burn Fs Z (89) used in phonoliash hoseb, pain-thur Blazes and some containers (Ref 4, p. 179) 59) Ditto Z (89)B, (89)C & (89)D used in some containers (Ref 4, p. 175)

(Ret 4, p 1/7)
51) Elec Imp Fz ElAZ (106)\* used in Flying Bomb\*Penneminder iS\* (Ref 4, p 149)
52) \*\*Dust Fuze\*\* used in SD 10 bombs (Ref 4, p 191)
, (See description under Di.

(See description under Di.

Following are abbreviations and designations used for bomb funes:

homb Junes:
AZ
Aufschlagzünder
Elztz
Elstrischer ZeitElstrischer Zuger
Elztz
Elstrischer Zügder Elstrisch (fune)
Lazgeit
Voraugsmünder
Safety fusien
Safety fusien

Z Zinder Fuse
Zid Zeitzünder Time fuse
Zid Zusatz Addition
Zid Zusatz Addition
Zid Zinderwischen Fuse strension cap
stück wire au jene at the ead
this German section, following the Vorablagra

this German section, following the Vocabulary

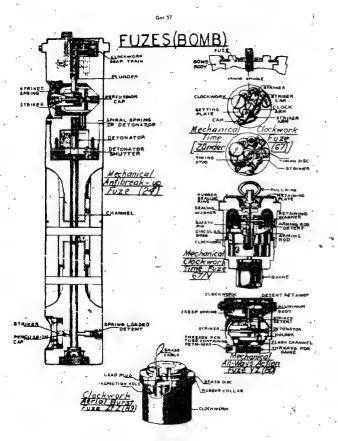
Several of the German builth fuzes were examined as
Picatinny Araenal as can be seen from the following reports:

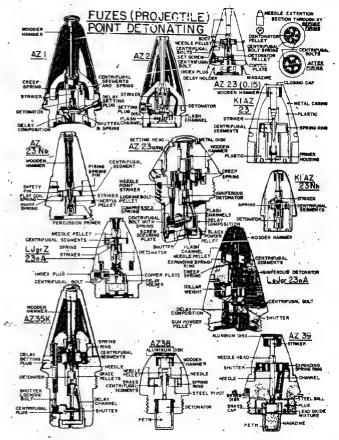
4 A.B.Schilling, Pic Aren Tech Rept 1522 (1945) (Chemical Long Delay BombFuse, E1AZ)
 b) A.B.Schilling, ibid, 1574 (1945) (Mechanical Time Long

b) A.B.Schilling, ibid, 1574 (1945) (Mechanical Time Long Delay BombFuse, L. Zr Z) c) A.B.Schilling, ibid, 1581 (1945) (Icreanannous and Long

Vistav, Bomb Fuze, El AZ 35A)
(See also Aprill Burst, Antidisturbance and Klectric Fuses)

B. Prajectile Fuse (Greekosszinder) existed even in a greater warsty than bomb fuses. The former may be subdivided into Point Detonsting (PDIs) and Base Detonsting (BDF) types. A birtif description of typical





German projectife fuxes is given by Englesburg (Ref 2).

The following types are listed and briefly described in Refs 3 and 5.

in Refs 3 and 5.

I. Point Octonoling Fuxe

1. Imp Fx AZ 1 used in 75 mm and larger caliber shells

(Ref 5, p 584)
2. Imp Fx AZ 2 uses not indicated (Ref 5, p 588),
3. Perc Fx AZ 23 Sacion were the most important and

wied throughout for Grenne Artillery Ammunition, mostly for 72 metallic for the first state of the first sta

a) Perc Fx (with delay 0.15 and 0.25 and 1.5 and 0.75 and

b) Perc Fa AZ 23Geb used in the 75 mm blountain Gnm (Ref 5, p 576) c) Perc Fm plastic body AZ 23V(0.15)(Pr) and AZ

23V(0.25 XPr); uses not indicated (Ref 3, p 353) d) Perc Fx plastic body AZ 23Nb(Pr) used in 150 mm. Smoke shelts (Ref 5, 607)

a) Perc Fz zinc body AZ 23V(0.73X2a) and AZ 13V (0.23)(2a); uses not indicated (Ref 5, p 573) f) Modified Perc Fz AZ 23ung used in 75 mm and

105 mm HE shells (Ref 5, p 575) g) Perc Fs AZ 23/28 used in 88 mm HE AA shells (Ref 3, p 349)

h) Perc Fx (delay 0.15 sec) AZ 23/42 V(0.15); uses - mrt indicated (Ref 5. p 573)

i) Perc Fu (modified) 1 jg.Z. 23AA used ins 75 mm Light Infentry guin Another model of 1 jg.Z. 23AA was used in 2 10 mm Rocket 42 (21 cm Wgr 42 5pt) (Ref 5, p. 583) j) Parc Fu and Perc Fu (delay 0.4 sec) sjg.Z. 23 mad 13V(0.4); uses not indirected (Ref 3, p. 946 6, 5. p. 573 k) Perc Fu sjg.Z. 23Nb (algsZ. 23Nb) used in Smoke shells (Ref 3, p. 575).

Note: Other less important, versions of fuse 23 included; AZ 23 (obsolete), h.z. 23 (0.2) and AZ 23 (0.2) (ung) (Ref 5, pp 573-4) 4) Small Perc Fz "klaZ 23 Series existed in the following

wariations:
a) Perc Fu (amall) klAZ ,23 used in .75 mm HE and 75 mm k 105 mm Smoke 4 mls (Ref 5, p 576)
b) Perc Fu klAZ 23Mb used in Smoke shella (Ref 5,

p 578)
c) Perc Fz with delay 0.2 sec, modified klAZ 23V
(0.2Xumg) used to 75 mm A/T Guas 40, 42, 76.2 mm
Russian A/T Gun 36 and Field Gun 39 (Raf 5, p 574)

Note: Other, less importunt, reasilence of meal fuse 23 included that 237(0.2), k1,22 23/1, k1,42 237(0.2), (Pt) and MAZ 23N(Pt) (Ref.), pp 578 2578)

3) imiterous DA and Gazze Type Fz (with a combined)

graze and DA mechanism) AZ 35K used in 170 mm AE Shell (Ref. 5, p 5007 6) Mech lusp Fz AZ 38 used in HoC projection (Refs. 3, p 353 & 5, p 568)

71 Detonating imp Type Fs (with DA mechanism) AZ 39 used in 50 mm HE shell (Refs 3, p 317 & 5, p 569)

8) Pere Fr klaZ 40Nb & 40Nb(Pr) used in Smoke projectiles (Ref 5, p 5"9)

9) Perc Fr AZ 47 & AZ 48, similar 1a construction to AZ 19, were used to 20 am Ammo (Ref 5, p. 571) 10) Perc Fr AZ 49 used in 20 am Shell (Ref 5, p. 571) 11) DA Jusy Fr AZ 150 & 100 RbS used in 20 am Shell

(Ref 2, p 315 & 5, p 564)
12) Imp Fz AZ 1502F used in 20 mm Shell (Refs 3, p 303 & 5, p 547)

13) imp Fz AZ 1503 weed in 10 mm Shell (Refs 3,-p 309 25, p 547) 14) imp Fz AZ 1504 used in 10 mm Shell (Refs 3, p 309 At 5.0 547)

Isop Fz AZ 1531 weed in 20 mm Shell (Refs 2, p 315
 p 307 & 5, p 549)

16) imp Fx AZ 1552 used in 13 mm Projectile (Ref 5, p 550) 17) imp Fx AZ 1551 used in 15 mm Projectile (Refs 2,

P 316 & 3, p 550) 18) lap Fr AZ 1552 used in 15 mm Projectile (Ref 5, p 556)

p 556)
(9) DA and Grave F2 AZ 2492; uses not indicated (Rof 5, p 556)
(20) Imp DA F2 = Z 3045 used in 20 mm Shell (Ref 5,

p 552)
21) Mech lnp Fs AZ 5772 used in 28/20 mm and 42/28 mm
HE shalls for Tapered Bare guess (Rafe 3, p 313 & 5, p 553)
22) Imp Fr AZ 5075, AZ 5075 mK & DAAZ 5075 used in 37 mm Rodded A/T Bosh 53,7 cm Pak 521eJemante)

13 37 nm Rodded A/T Bomb (5.7 cm Pmk Scielgmante) (Refu 3, p 319 & 5, pp 556-5) 23) Imp Fz AZ 5095 used in 88 nm A/T HoC Rocket

(Ref 5, p 555)

24) Imp Fz AZ f Hbgr used in 150 max Shell with BC (Ref

 Mech Time and hep Fr Dopp Z 28k used in 210 at 280 mm projectiles (21 cm KGr 38 & 28 cm Gr 39) (Ref 5, p 605)

16) Merch, Timer-ind/or imp. Fav. DoppZ. 5/60. Fi used as 8m mm and 105 mm HE A. Abella (Refs. 3, 938 ab., 9.603) 27) Ditto DoppZ. 5/60x; uses not indicated (Ref. 2, 9 308) ab., 9603 abella (Ref. 2, 9 308) Merch Time and Graze Actions Fa. DoppZ. 5/90/43 and in 170 mm Guo in Morter Mounting (17 cm Ki MesLaf) (Ref. 5, p 601).

29) Combination Fx Dopp Z S/160Geb used in shells for Mountain guns (Ref 5, p 596) 30) Supersemaitive imp Fx EKZ C/28 used in shells for Naval guns (Ref 5, p 565)

31) Elec Time Fr EIZtZ S/30; uses not indicated (Ref 5, p605)
32) imp instantaneous and Delay Fr under BC HbarZ 33D

32) imp instantaneous and Delay Fz under BC HbgsZ 35E used in 210 mm Rocket (21 cm Wgr 42 Spt) (Ref 5, p 585) 33) Ditto HbgsZ 35K used in 170 mm HE Shell (Ref 3, p 391)

34) Imp Fz (Russian Design) KTM-1 used in 76,2 mm HE Shell (Ref 3, p 377) 35) DA Detonating Type Fz KZ f4,7 cm Pak Sprgr used in 47 mm HE Shell (Ref 5, p 366)

36) Merch Imp. Fr. (with a self-deutroping arrangement). RZ ZeriP\* used in 37 mm MZ. AA Shell (Ref. 5, p.557). 37): DA Mech Imp. Fr. (with a safety device which is a blassed by the disintegration of a pellipt of guapowder). KZ ZeriP\* used in 37 mm HE A/T Shell (Ref. 5, p. 558).

38) Mech imp Fx KZ 38 used in 40 mm HE Shell for Bofors Gun (Refs 3, p 323 at 5, p 561)
39) DA imp Fx KZ 38; uses not indicated (Ref 5, p 561)
40) Mech imp Fx (self-destroying) KZ 40Zer/Pv used

in 37 mm HE AA Shell (Refu 3, p 315 & 5, p 557)
41) Graze and DA Fu KZ C/27(LM) used in projectiles
for Naval Guns (Ref 5, p 565)
42) DA Detonating Type Fz used in 47 mm HE A/T Shell

(4.7 cm Pak Spg) [Ref 3, p 327 & 5, p 566) 43) lmp Fz (Czech Denigo) M 35ENZ 3/40 used in 47 mm German Ammo (Refs 3, p 331 & 5, p 568)

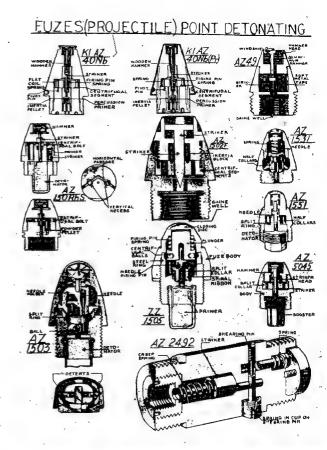
44). Perc Fz (Skoda Design) used in 75 mm and 83,5 mm projecties (Rel 5., p 589)
45) Combination Time and Imp Fz VZ 75; uses not indicated (Ref 2, p 318)
46) Perc Fz WarZ 36 used in 150 mm Rodded Bomb &

200 mm Spigot Mortar Bomb (Ref 3, p 389)
47) Mech Imp Fz Wgr2. 36 used in 50 mm HE Mortar Bomb
(Refs 3, p 35) & 5, p 392)
48) Imp Fz Wgr2. 50 used in 280 mm, 300 mm & 320 mm

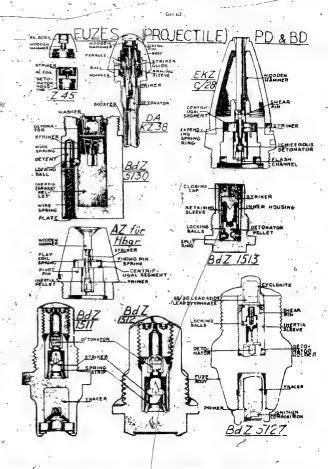
Rockets (Refs. 3, p.397 & 5, p.593)
49) imp. F2 (plastac body) WgrZtZ ACB used in 80 mm Smoke Mortas Shell (Ref. 3, p.381 & 5, p.591)
50) imp. Fx Z. 45 used in 20 mm Shell (Ref. 3, p. 304 & 5,

p 551)

51) Mrch Time Fx ZtZ S/30 & ZtZ S/30Fgl used in 88 mm & 105 mm hE AA shells (Refs 3, p 359 & 365 and 5, p 594 & 597)



FUZES(PROJECTILE) POINT DEJONATING MATOR HOLDER



52) Self-Destroying Fn 22, 1505 union in 20 mm blenne. Gun (Refs 3, p 311 dr.5, p 546) Il. Been Detenating Funen (SDFu)

1) Imp Fa BdZ 1511 used in 20 mm Shell (Refs 3, p 399 2) Imp Fa BdZ 1512 used in 20 mm Shell (Rajn 3, p 399 3) Imp Fz BdZ 1513 used in 20 mm Shell (Ref 5, p 609) 4) Imp Fz BdZ 5127 weed in 38 mm APC BC Shell (Refs

2, p 3 19 # 5, p 609) . 5) Graze Action Fr 342 5130 used to 37 mm Rodded Bomb (3,7 cm Stielgranate 41) (Refa 3, p. 401'# 5, 611) 6) imp Dalmy Fn B4Z C/36 aged in heavy Naval guns

INTE 7, P DAMA:
7) Imp or Grane Action Fn BeZ DOV used in 150 mm
Rocker (No 13, p 423 & 5, p 622)
8) DA Imp Fn (Small Faviry) 50 mm AP and 75 mm HE
shalls (Kele 3, p 411 & 5, p 617)

sauls (Rein 5, p 411 & 5, p 517)

9) DA Imp Fa (Lucpe Cavity) BdZ f 7.5 Am Page used in 75 mm APC Shell (Refs 5, p 411 & 5, p 417)

10) Imp Fa BdZ f 7.62 cm used in 76.2 mm Rusaine denign

shift (Ref 3, p. 613)

13) DA lop Pa (Small Cavity) BdZ 8.8 cm Page used in its max AP Shift (Ref v.) pr 45 de 5 p. 619)

12) Mech imp Fa (Large Cavity) BdZ 8.8 cm Page used in 12 max De Shift (Ref 3, p. 417 h. 5, p. 619)

13) Imp Salective Daley R. BdZ 11 or Gr 193e used in 130 mm Apjacencytic Spell (Ref 1, p. 417 h. 5, p. 622)

40 mm Apjacencytic Spell (Ref 1, p. 417 h. 5, p. 622)

41 log Fa BdZ 185 used in 4 mm AP Shift (Ref 5, p. 415 h. 5, p. 622)

53 DA (Small Ref 5, p. 415 h. 5, p. 415 h. 5, p. 622)

15 DA (Small Ref 5, p. 415 h. 5, p. 415 h. 5, p. 415 h. 5, p. 622)

not indicated (Ref 5, 611)

16) Elec Risevent Fx ERZ 19 used in 150 mm & 210 mis Rocketa (Reis 3, p 423 & 5, p-623) 17) Imp or Genne Fz (Polish Denigs), 27/34 WZ 36 unos

in 37 mm Polish Design Shell (Ref 5, p 614) 7
18) block hap Fz WZ 36 used in 37 mm Polish Design Shelkings 3, p 405 & 5, p 615).

Fellowing are abbreviations and designations used for Projectile funes: Auluchlagadodet lupact fuse, point serenating (PD) inte

	344	States in Primary -	Large on construct Dr. 1 semi
	Dopp 2	Deppala finder	Combination fune (time
			"ned impact)
	EXZ	<ul> <li>Empliedlicher</li> </ul>	Sensitive type of PD
		. Koptalinder	fuze (under ballistic cap
٠	EIZ	Eleherincher	· Electrical fune
	.,	Zilader "	2
	KIAZ	. Kleinenfenklag-	Small impact fyne; small
		a finder	PD fuse
	K+12	Kopitander	· PD fuse
	KZ.	_	PD fuze under a bellissie
		1 P	enp, except in the case
		4 4	of KZ 38 as ordinary PI
	. "	* .	

Morear shall fuse, infastry

gue or howsteer shell

fuze

Time fute Note: The letters No following the fuze aumber signify smoke shells; the letters ZerlP signify the presence of a guapowder peller which is destroyed on firing to release a centrifugal firing device. Fuzes with a setting device for optional delay are stamped with the letters "m", "Y", "o" to indicate the position to which the slot in the setting. plug must be set to cause either delay or non-delay. The "d" examping indicates the setting position for "fithout delay", the "Y" stamping, followed by numerals such as

V(0.25), indicates delly and the figures, the period of

delay. The letters "o V", stamped together, signify "ohne

Verzögerung" (without selay), while "mv" signify

" Verzögwrung" (with delay). Other German abbreviations are great at the

"American and British Abbreviations"

American and British Abbreviptions: AA Antiniceralt; AC Anicraft: AP Amorpierciag A/P Antipersonael; A/T Accional; B Bane; SC Bellinite cap; SDPs Base detonating funct. C Capped; D Detonating; DA Direct action; Blee Electrical; Fr Fuze; ME High explosive; HeC Hollow charge; Imp Impact; Inc Incording; M. Mark; Moch Mechanical; Pere Percussion-Refetencen:

1) Anon, "Enemy Bombs and Fuxes", War Dept TM E9-1983 (1942)

2) E. Englesburg, "The Components of German Artillery 2) Englesburg. The Components of German Assistory Andiquation." The Ordinace Serganset, May 1944, pp 313-19 3) Anne., "German Artillery Projectales and Faxeu", Ordinance Bomb Disposal Centre, Aberdeen Praving Ground and Shary Bomb Disposal School Washington DC (about 4) Anon, "German Emplouive Ordnunce" (Bomb Puteri),

TM 9-1985-2 (1953)

TM 9-1985-2 (1953)

TM 9-1985-3 (1953).

Fuse Trein (HE Train; Artillery Ammunition Train) (Zündersats) in described in the general section).

The information in Table 17 is taken from Pications Arsenal Technical Report No 1555 pg 11-15 and some Chemical Laboratory Reports, (See witt page): "G 3" Fusebreif. See Fusebrad "G 3".

Guine See Detonatore Used in Fuses.

Colontes, See Gelone.

Gellery, Teeting. See Versuchsetrecke.

Gasdruckpotrenen (Gas Pressure Cartridges). See general section and sino the article entitled "Die Entwicklung der Gasdrucknatrosen in Deutschland' by E.R. von Hers in Explosiveroffe. 1954, Nefe 5/6, pp 64-8.

Gaseous Matel Treetened, such as thrometizing of item or steel articles by the diffusion of chromous chloride rapper it high temperature is briefly described in BIOS. Einsl Repus 839 (1946) and 1534 (1946).

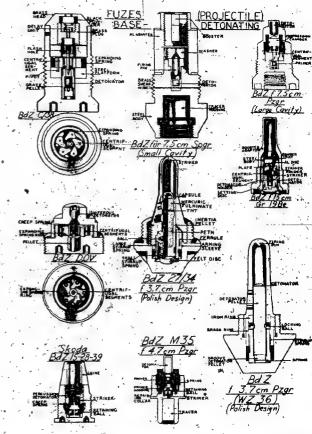
Sasless Delay Derematers (Electric). German moless delay desonators, of WE were usually proposed no follows: "Al or Cu decourse shells (Hilling) having an outside diameter of 7.20 mes (for Al) and a length ranging from 52.5 to 85 am (depending on the delay required) were thoroughly cleaned and dried before londing.

"Terryl was loaded first in two increments, a total of 0.7g, to serve as a base charge; this was followed by an initiating charge of 0.3g of 60/40 L A /L St. mixtureand a perforated (reinforcing) cap all pressed at 250 kg/cm2.

Note: Tetryl, as well as L A. and L St , were previously dried to a maximum mointure content of 0.1%.

After keeping the loaded detonators for 3 days at 30 in order to remove all traces of moisture, 50 mg of loose intermediate composition was placed on top of the reinforcing cap: .

Note: The intermediate componition (powdered mixture of Sb and KMnO ) forms a loose connection between the delay composition (to be loaded next) and the mutiating composition. (L. A /L St.). The intermediate composition, burns with a strong flame which facilitates the ignition of LA /L Sc mixture. Mixtures are possible if the delay mixture is placed in direct contact with L A/L St (Cont'd on p 65):



	Push Trains		10	
		charge le		
· * * * * * * * * * * * * * * * * * * *	Upper	heet-	Lawes	Uban
	Upper	mediane	,,	3.3.4
* ***		made and		
66/34/5 ECIO /55 5 /	1.86	- 1	LA.	.37mm AP shell
alimaine			1.0	
Same on above	Block powder	B E'A'	PETM/INT	47mm AF shell :
Street by notice	(cover charge) /		`	11
Since se show	55/45-L A /L S	1	PETH	30mm AP and HE
State of Head	740.0			shell, "Blum -CM shell
Sin Sirelen	39/34/7-L A /L St /shessive	-	PETN:	66mm AP shell 62
3000 00 0000	M.F		50/50-TNT/	Land mine
Squar no phone			netryl	
Same of Phone	G/37LA/LSt.,		Touyl	40mm Hit shell '
Labor of Males	LA/Co nilicido	- '	PETH	30mm HE shell had.
Head ;	24700	١ ، ،		HE upor bore rehall
	(24/43/32/It- Black		PETN -	37mm AP shell
The last	/M N -/KCIO: /	- 3:		
~	the Samuel A facility	. 1		8 , 4
	27/21-1 A /35 3 /		PETH	_37mm_sed:59mm
Drag.	pondac/M F -/RCIO; / Sh S, javor(L-A /stid \$2/5/11-1, A /Sh S, sheatwe			HE shells
and designation of the second second	L A		PETN	*47mm HK shall
29/49/51-H F/RCIO_/36_8_ 18/H6/54/6-H F/KCIO_/	LA		PETN	47mm HE shell
14 mm/34/4-2 1/ ECIO*/				1,4
. Sh <sub>2</sub> S <sub>3</sub> / shooting		1 1		
24/34\f13-kCl0*\2P*2*\	LA/LSt		PETH/wax	50mm AP shell
and the second s			· 12.4.	- 1
8/60/29/3-W.F /ECIO_/	LA/LSt.	- 1	PETN/vax	75mm AP shell-
Sh.S./ place	1			1 1
	14/86-L A /E Sc.		95/3-PRTM/	47mm AP shell
59/27/10/4-ECIO_/3b_5_/C/	147 Per 2 7 2 4.		WAR .	
	*: 55/45-L A /L 24		PETN	75ma AP shell.
Some as above	L A /L 34		PETN/wax	Shon AP shell
24/31/34/2-M.P. /KC/O./	2.074.00			
36.3 /plane		1 1		
Mont	65/35/-LA/LS4		ROX	. Phon AP shell
None	55/45/-LA/LR	. ***	PETN	Staro HE Mech, TE
13/43/34/8-M P /KCIO.J	55/45/E'% /L Se		PETH"	105mm HE Here
Sh.S./ similes	1		,	shell
Head to	94/6-L A femorese		PETH	A/T Stick-greende 41
51/24/25-ECIO_/Sb_B_/	EA/LSt.		PATH	
21/24/25-ECE/ <sub>2</sub> /28-22/ BH	LA/LM:	Liste	PAIN	50mm Her beab
Need	(5/76/1 9-HC/Look unido/		PETN	Street May biret .
4 ,	ail icus ever (25/52/25 ".	1.		
	KCIO_/PaCrO_/milicen )	. "		
			40/60.	Rellermine 35
14/38/42/6-M F /ECIO_/				Witnessen 33
Sb_S_/ glass	N.F	i .	(pressed)	- >
	1 *simme			Tellismine
. 41/41/3/15-J. 8e /	59/39/2-L A /	1 * .	PETN	42 or 43
Bacilo ) /Sa S./	L St /graphise	[		44 W 42
Ca silicide	1			4
63/35-L A /Ca ~	LA/LSt	1 * '	87/15	Bush HeC shell 58, I 05mm HeC shell 39
siticide ever PETM	W	( , -/	PETN/#82	(1 VOMES HOC MOST 39).
•		1 .	and retryl	4
		٠	pooster	A/T Rocket 10
Nese	94/6-L A /setracese	1 .	PETN	A/T Rocket 30 Streen A/T.HoC
None	94/6-L A /terrscene	1	PETN	Rocker
	1	-	h Harry	Blum A/T HoCs
Ness	LA/LS	1 -	IN PRINCE	Rocket, 150mm
* 5.	1	1	1 10	Rocket 41
1.			PETN	dia distant
None	60/40-L A /L St	1 -	PEIN	Down Rockes 42

Abbreviolence AF Armer-piercing; A/T Antiquals; BD Bane' decounting; CM Chimical morter; F Tune; HE High, or pleave; "Hot Hollow charge; How Howitzer; L. A. Lead anide; L. Se - Lund atyphante; M . Mercatic fulmi Morter; PD Point detenating; PETM Pentserythritol tetranstrate; T Time; Telloreine Land mine

sections composition the delay stament conty a com- arrante of explosion 2485, volume of gages at NTP 264.4 seemed pulveruling mixture of 55 and Riday. The '1/kg, specific peasance 3733 and dermanter shell was then crimped just above the upper References P. Naoun, Nitroglyceria (1928), pp 378 and 361 and of the delay always in order to provide a neat for the Mippless stelling plug.

According to CIOS Rest 24-3, pp 5-6, the gasless of these permissible explosives are described by Nacon. powder (also called 'gasless delay fuse powder ) ted of about 70% Sb powder and 30% K germanganate for alow burning, or about 46% \$6 and 54% & permangunare for face burning. The purpose must was ground in a disc ree tase, manne, jue purmapunare was ground in eine or plane dismeter milt to appreciancely 30 meah. The Sb was ground; from lumps in a vibratory ball mill and the powder was transferred by a nerew freed into an air separator. The finer which did not exceed 10 microns in size were The fines which did not exceed 10 microns in any were collected and blender with the permangange by means of a tambing mill. The resulting matter was compressed than the pablests were formed to give more infinite collections. The collection was the ingrediently. The shelter were the horse down at all and the resulting powder used for filling deconstore.

The inches engently (see Fuschesd Manufacture) cos sisting of bridge wire, igniter bend, two lead-in wires (insulated by Mipolam) and the Mipolam plug was inseried in the decourer shell in such a manner that the plug rested on the shoulder of the detounter shell formed by crimping. A second crimping was then made above the alug and the lead-in wires were connected to a senter of electricity when the deteaper twee or he fired, 1 Referencest

London (1986),Appendin A3

2) Assa, Manufacture of German Depastors and Decempting Compositions, Ph Rent 95,613 (1947) (Section B to L incl). Camptonion. See Gandruckpatroneli.

Goganlisting, oder Kumulative Zimbung (Rusning Toward. or Cumulative Printing), la order co increase the efficiency de an explosive charge it was initiated aimslune outly from the opposite ends, using two electric blusting cape or pieces of dereanting forc.
[A.Sartbacker, Spreag. and Schieseroffe, Zileich(1948), p 155]

Colorino-Astrolit (Gelecin-Astrolite). A plastic low-freezing explosive based on dinitrochlorohydrin (DNCH). Several ensieties existed, of which the composition manufactured before WWE by the Dynamit A .- G was widely used in shaft sinking by the freezing process and also in other rock work where low-freezing dynamics is desired during the colder parts of the year, such as in building water power plants. it had approximately the following composition and prop-enties: geletinized dinitrochlorohydris (DNCH), including NG 30, mixture of DNT and TNT 10, and Am and Na nitrate with wood meal 60%; Trauxi tent value 400cc, Pb block crashing 18.0 mm, sensitiveness to initiation required at least a No 3 cap, propagation (gap) using two 25 mm curtridges 20.0 mm, velocity of detonation 7300 m/acc, heat of explosion 1127.5 Ecal/kg, temperature of explosion 2534".

dennity 1.45. The gelatist-Astralit which was permitted to be transported on German railfoods was required to contain aclasinized disitroglycol 30, aromatic disitrocompounds 8, asomatic trimirocompounds 4. Am nitrate and vegetable meal 58%. for properties were: Trauzi value 415 cc. Pb block crashing 19.0 mm, sensitiviness to initiation required at least No 1 cap, propagation (gap) (using two 25 mm carmidate 50.0 mm/ velocity of detonation about 6500 m/sec

at a density of 1,45, heat of explosion 1158 heal/ke, tem

Gefetine-Corbonit (Gelntin-Carbonite). Several varieties

Nitroglycerin, Baltimore, (1938), pp 407, 411 & 441, as.cas be seen from Table 18

, ,	Gelitta-chrisaites						
Ingredients and	: 1,	ш	D	No designation			
Amnittate	* 81.0	46.4	31.5	41.5			
Na piernee	4.4	7.0	**				
K nisrate			5.7	1			
NG (muned with colled cotton)	-23.6	10,1	50.0	26.6			
Glyceria pius gelutin	4.0	5.0	2.5	6.9			
No chloride	24.0	27.5	30.9	25.5			
Vegerable men!	10.0	4.0		1			
TNT	3.0	١.	1 -				
Ultramarine '			L	0.1			
Onygen Balancu,%	-13.1	12.2	+ 5.3				
Trauxi Test, cc	220.	200	225	260			
Veloc of Detonation, m/sec		1 -	-	2500 :			

ine-Cheedit (Gelatin-Cheddite). Gelatineus explosives based on chierates, such as No chierate 70, and collect corres printinized with liquid TNT 30%. Reference: P. Nacon, Nitroglyceria, Baltimore (1928), 6 253.

Gal uting-Dahmenis (Galaxin-Dahmenite). A 1790 ing gelatinous explosive manufd before WV I.

Table 18a gives two types A and B

Table 18e		**	
Ingredients and some properties	Geletiere	الدوودا	7
Dinitor by series Calledine verses Nitrotolarenes Nitrotolarenes Nitrotolarenes Nitrotolarenes Naphthallene Ammonium nitrate Potansium nitrate Sodium nitrate Alkali chloride Trausi Teat, cc Charge limit in firedamp, grame	27.4 0.6 4.5 0.3 32.0 2.0 5.5 27.5 233 350	27.4 0.6 3.5 32.0 2.0 4.5 30.0 205 700	*

Reference: P.Napum, Nitroelycerin (1928), p 419

Galutina-Donarit (Galatin-Donarite). A type of gelatinos industrial explosive commissing about 50% of As sitrate, 30% of mixture of diagrochlorohydrin with mirroglycol and 20% of other lagredients, Its properties are: temp of unplonion 3225° C, vol of gases at NTP 803 1/kg, carridge density 1,45, specific pressure 10100 kg/cm2, veloc of deton 6250 m/sec, Traus! test 380 'cc and impact sensitivity with 2 kg weight 20 cm. (See also Donnett Gelatin Type, Sunder Donnett) .

Reference: F. Weichhelt, Sprengorchaik, C. Marheid, Haile/ Saale (1953), pp 37 & 375.

Geletice-Dynamic (Gelarie Dynamice) - the first gelatinous NG explosive. It was proped by A.Nobel in 1875 (See Swedish Section). The current pelatin-dynamites consist of 10 to 65% of a liquid nitrie auger tauch as NG mined with a small amount of collodies corton and 80 to 35% of "Zumisch-

sulver", "called in the U S A "dope" . .. They may be subdivided into the following typen:

A) Gewillelichen und schwerzefnurbaren. Ordinary and difficultly freezing (low freezing)

B)' Phlugmatinierers, transportuickeren - Phlugmatized, unfe C Schlaguetteres: Sale in the presence of firedamp (per-

missible dynamicos).

To the A type of dynamics; belong the blusting geletin and the dynamics shown in Table 19 with the exception of those which commis only a small amount of NG. Any of these emplecises may be readered low-freezing by incorpereting nimegly cel, dinimegly ceris, dinimechloshydeln, our

The following composition, Linted by Stembacher (Ref 4, p 83), may be given as an example of the "schwebterfrierbares" dynamite : RG with nitroglycol 62.5, collect cotton 2.5, Na ot X-nitrats and/or K perchlorate 27.0, and wood mint or tye ment \$,0% with prepared chalk (Schillmenkreide) added 0.5%.

To 198 S group belong dynamics in which part of the NG is replaced by distirochlochydrin .

Note: Aromatic nitrocompounds have been used in countries to replace pare of the NG.

To the C group belong explosives containing small amounts of MG and appreciable amounts of cuoting agence . such as alkala chloriden. Dynamicon which commin insper mace of ammonium nitrare (see Ammongelation) alon baloon to the permissible group.

Table 19 which follows gives composition and

properties of typical geletic-dynamics

Table 177										
Company	· Mah-man	High-namegab grietie dynamices			Other pelatin-dynamites					
properties	Blasting	813	,00%	22.28	106.3	No 2	200 3	100	160 4	2405
NG Called cotons Vagasable meal INT & DAY Hydroceirbes Z steeden Z steeden Albeil netwee ann/A E perchlorese E perchlorese Cooling agents, so as allali chleriden	72	7.4	3 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	246.2	2.5	36 to 51 3 to 5 9 to 6	40.4 10.0 44.0	7.Q 41.0	2.0 9.8 41.0 12.0	18 to 20 2 to 4 3 2 54 12
Onygon Belases, S Denaity Tenuel Xeer, ev Pb Block Crushing in non Max Veloc of Deceasion, m/or Heat of Englasion, kčni/kg/H <sub>2</sub> O vasce Trup of Expla. **C	9000 1560				14.4 1.55 400 36.6 1000 1235		17.0 1.6 290 18.0 6504 1850	12.0 1.7 230 19.0 6500	65 00 1150	11.0 1.8 250 18.0 6509

Morey Due to the abortuge of nicroardmitte con during WE 5 the Germans used some commercial dynamics in denotition charges he well as in some hand greenden, (See also Association, Association, Dentit und Melatine-Dynamit).

Referencess 1) PiNaoin, Nitroglycerin etc., Baltimest (1928), pp 331, 334 and 349-50

2) 1 Pepin Laballeur, Poudres, etc., Paris (1935), p 353. 3) Ason, Allied and Enemy Explosives, Aberdean Proving

Ground, Mi (1946) pp 15242 4) A.Sterrbecher, Sorene- und Schiennteffe, Zürich, so 85-86

Galerian Leant (Odatin Leonite) - One of the permissible pelatinous low-freezing explosives manufed by Westdoutsche Sprengeroffwerke as Dormand J. Naom, Nitroglyceria (1918).

Tyble 20" (Galetine-Presperit)				
Components and some	o " Des	o 🤌 Designation		
properties		2		
3DNCH (diaistochlorollydrin)	9 20.0	~20.0		
NG (nitroglycerin)	-5.0	5:0		
NC (nitrocellulose)	0.5	0.5.		
DNT (dinimensluese)	5.0	5.0		
Cereal meal	. 25	2.0		
Anthitrape	136.0	30.0		
Na sitrace	4.0	10.0		
Na chloride	. 21,0	27.5		
K ozalate	6.0	-		
Oxygen Belance, %	* +0,4	-1.2		
Trausi Test, cc	225	210		

Galatine-Prosperite (Geletin-Prosperite)- According to Nacon (Raf 1 & 2) gelatis-prosperites were low-freezing gelatinous amplonives based on distrocklorohydria. Table 20 Justs run such explesives.

(See pervious page), References:

1) Binain, Schiens- und Sarengeroffe; Dennien, (1927), à 152 21 Namus, Nicroglycesia, Baltimore, (1928), p 418.

Gulatino-Rome mit. Same no Gelatine-Donneit [ Weichelt, (1953), p 37 ].

Colottae-Telate . See under Swiss Explosives.

. and mino-Transmit (Gelatin-Transmite). Gelatinized, 'lowfreezing explosives, magnife for many years by the Cantroper Sicherheitesperagetoffe in Vemphalia, Eg : a) gelptinized di- and trinitroglycerin 47.5, DNT 5.0; wood meal 5.0, Am niemes 22.5, and Na nitrate 20.0%; Trauxi value 400 cc: a) geinzinined di- and trinitroglystrin 30.0, DNT ,10.0, wood seed 2.0. Am signer 40.0, and Na signer 18.0%; Trauxi

test value 375 ec. Ruference: Namus, Nitroglyceria (1928), p 368,

Gulstian-Worter-Astrolity Gelatinous (low-freezing dynamics, most infer to WWIS s) districts freezing (20.0.) MG 5.0. colled comme 6.5, DNT 5.0, menl 2.5, Am minute 36.0, Me Mirmes 4.0. K conless 6.0. and No chloride 21.0%; Trauxi sees 225 cc. and oxygen balance w 0.4% (Ref (1); b) disjerschlerebreite 16, NG 4.8, colled corres 0.5, MNB 1.0, DNT 4.0. Ab airrass 7.5. flour on porate meni. 7.5. Na airrass a 8.0. charcoal 0.5. canter oil 2, Am emilate 2.5. and Na chloride 14% (Ref 2): References

1) Marin, Mitroglyceria, Beltimere, (1928), p 418 2) Thomas Distingary, London, v.4 (1940), p 554.

Column-Wester-Schooler. A permissible explosive for use in gapeous deal mines; pelecisized NG 30, Am situace 26.5, wood meal 0.5. No chloride 40 and 3% of a 50% squepos salution of Co nitrate [ A. Stetthacher, Sprong- and Schiegestelle. Zleich (1948), p 91-2 1.

Galattalarithighett von Mittocollulosa (Gelittinining Abilly of SCh-Sec Knot-ttern, (1946) pp 111 & 201-4-

And estate control . index . Like emitted . Son: Golaria in consequential file Nitrocellulose.

Columniano (Galacinization). See peneral section. Salatticiarungumirial - für Hitrocolfulose (Geletinizing, " ment for ICC) . See Knor-Meuz (1944) pp 109:162.

Substintervariabres (Galatinization Process), Galatinization of MC in described in the mineral negation.

Galacie \$ (Gelacize I). A mining explosive consisting of 30 to 37.5 Am nitgate, 30 of NG (containing some colled cotton). 0.5 to 1.5 wood (low , 0 to 2 DNT (cours 0 to 50% TNT) and \$2% alkali chloride. It-was permissible in passeous coul, mines, provided the charge was not nigher than 200g. in duty and non-gangous mines the dexisten charge, was

(1955), p 414

2) C. Beyling and K. Drekopf. Sepagatelle- and Zandwitte Springer, Berlin (1936), p 100.

Golbmohl (Yellow Flour). Same as Tetranitrocarbanole. Gelbmehl & (Yellow Flour S). Same as Tetranitrediphenyl-

Gallgair II. One of the gelatin dynamics manufactured before WWI: NG 47.5, colled corres 2.5, K sitrate 37.5, wood steal 5.5 and tye meal 3%, [Naoum, Nitroglyceris (1928), p 33d].

Geloue or Guinctum (Carrighan Monn), (CaH 100 g) , m set (162.08) x. Carbohydrate obtained from agar-agar, its assecue solutions were used in some ammonium nutrate emplosives for controlling the planticity, such as in Verter-Vanagit B: NG 27.8, NC 0.7, Am aterate 30.5, sock salt 39.5, priose 0.7. wood ment 0.3. and cale 0.5%. Referencent

1) R.A. Crofe et al, BIOS Final Rept 835, Item 2, H M S O . London (1946), p Al/11 2) PB Rept 62,877 (1946), Table 1.

Galaunkirchen Tauring Gullery (Schlagwegree-Verauche strocke in Gelaunkirchen). See under Tenting Galleries in the agreemed sections.

Gerie 38: See . "DO Gerie 96", under Abbrevintinga ; the end of the Garman section.

Gerot 648. Same 760 cm Marner Knel", lincen under Wen

Serlich Type Gun (Gerlich Reducing Bore Gun). l'asered Bore Gue or Squaezebore Gun,

Goodions spiltes probe (Prajectile Fragments Test). Francests Density Test.

Geschütz (Artilleis Piece, Gun). See under Venpon-

Geschwindigkuit der Preparet increase). The relation between pressure and time of burning of propellents may be determined as described in H. Bruenwis. Dan radchiose Pulver, Berlin, (1936), pp 213-20. If the men of burning is great, the propellent is called Schooll (quick) and if the thee is low, the propelled in called Language

Quality (Genilite) - Genilites were permistable emplorives used during and after WWI, Table 21 gives two examples

ċ	7.00	Designation				
Сомровейся			No I	No Z ,		
NG (nitroglycatin) DNT (dinitrotoluene) Ilm nitrate No nitrate Dentrin Na chloride			30.75 5.25 18.00 39.00 7.00	30.75 5.25 21.00 21.00 21.00		

1) E.Colver, High Explosives, NY (1918), p 167 2) F.M. Turner, Condensed Chemical Dictionary.

NY (1942), 2 289-

Table 23 (Gestelms-Persol)

Chapments and some	Decigo	· Designation		
aparties .	No E	No. 2		
perchiprate	35	34		
an hisrate	43	48		
7		10		
name .	1 # 1	-		
Carbon (grader)	1 - 1	2		
HG.	1 2	-		
Wood metl ()	4	6,		
Onymon Bulance, %	-0.3	+1.7		
Town of	110	325		

Carreine-Westfelt (Genteine-Westphalite) - An : ne type employive tennisting of Am nitrace \$4.5, DHT

17 0 and Al 1.5% (Ref 2, p 114). Auforuntus:

1) A.Marchall, Emplosives, Churchill, Lundon, vi(1917), p'304 2) E.Bomett, Explosivos, Von Nestrand, N Y (1919), p 214 3) P.Nassin, Schless- und Sprangereife, Steinhopf, Drundes (1927), po 129,133

4) P. Noonn, Nimeriveerie etc. Williams & Wilking, Balcimon (1924), p. 426 5) C.Boyling & E.Doobopff Sprongrouffe and Zindmittel. Speinger, Beelin (1936)

6) T.L.Deviz, The Chemistry of Powder and Empirelysis Viley, N Y (1943), p 364.

Table 22 (Gesteins-Kamalii

Composesti and poor 1 . Designation and source of information					
proporties	No 1 Fet 3,p129	No 2 Ref 3.pl 29	Rein 3a-6	T2 . Refs 346	
Na chloran Mantalegangháhlase (1990) Dialmangháhlase (1990) DAT à THE Minespressio (1962) Was meal Vegetable mails Parettis	76.0 3.5 5.0 4.3 2.0	83.0 8.0 5.0 1.0	72.0 20.0 4.0 to 4.0 1.0 to 2.0 3.0 to 4.0	75.0 20.0 1.0 to 2.0 3.0 to 4.0	
Oxygen Baleacz  4 Trausi Tues  Ph. Black Crushing Sonsicionests to Estimate Gap. Test (aking 25 mm	Required at le	rater :	+3.0% 290cc - 20 mm No 3 csp 8 cm	11.9% 280ce 20 mm No I cap 6 cm	
cutridges), Yeloc of Disconntion Density of Cartridge Hest of Explosion Temp of Explosion			5000 m/sec 1.57 1219 cal/g 3265°C	4300 m/sec 1.46 1241 cal/s 3300°C	

Contains-Parments oder Perments I. Perchlorage exslosive manufactured better WVI by the Sprengatoft A -G Carbonis for use in cornels and ore minest: K perthlorate 30, Am nitrase 40, Na nitrate, 7, TNT 15, flour 4. wood meal 1. and selly 1%, Its Trauxi sessevalue: wite 320 Cc. gap test 7.0 cm and sensitiveness to im-

Guerner Projectio. According to V. Domberger

Viking (1974), pp. 122-3). Dr. Otto Gesmer of Pecenetical developed during WE extremely alender, fin-stabilised subcaliber projectiles which could be fired from options.

color-like projection which coun be lived from equinary an herels. It sooms that these posjection were identical with the "news projection", briefly described under A. There projection were used in the 105 mm Antaircreft Com (10.5 cm; Flath and in the 200 mm Gun Type 3 (30 cm K-5). It year admired that by using such projection in the Gun K-3 the nage was increased from 37, miles, for the

colinest projectile, to 36 miles with the acres projectile congring a salest behind thick-malled fine. With a lightest

shirt searched to its middle, a range of short 90 miles

was assessed. When using this prejuctile the Intent dis-putsion was only about 2 mile. See also under Assess

There are explosives valuable for binning recht, on

constructions are , but not for givenous and plans. The

Gasteina-Albie. No parchieuse 90, DRO 12, wood men

Gasteine-Dorite, Am nittom 55, THT 15, E nisses 5.

ton floor 5 and No chloride 1070 valuely of decounties

4603 m/sec at d 1:17 with a 50 mm diameter southerd

Sanstanikumale (Genteine-Caralite), A. type of com-

storcial amplestive acressi varieties of which are alread

Ope of projectile, which instead of a seber had so oben

CHARGE THE PAGE TOFF E. (Blassing Beginnives).

3. phopositions 5 and MG 28 (Ref 5, p.129)

fallowing types have been mend;

charge (Rof 2, p 195).

Projectile).

pact with a 2 kg weight 70 cm (Ref 11. Gustelns-Perest.; (Lesteun-Persalite). A type of coumercial explosive described in Rel 3, p 133, The composition and some properties of these explosives are espen to Table 23

Controckto Dynamit (Stretched Dynamite), See under

Gowele (Rifle). See under Vermont.

Gowele 13. German steni-auromatic rille, caliber 7.52 mm. developed in 1943. This rifle incorporated some features of a similar Russian waspon, perticulatly the Descreence LMG (light machine gun) and the Tokarev semi-automatic

sills. The Gawehr 43 weighed 9.75 lbs together with a 0.25 pound ming and a 0.4 pound magazine. [M.Johnson, Jr., Ordenace 29, 306-310, (1945)]

Gawachilehomenongeristel (Industrial or mining explosives). See Commercial Explosives.

Card chrowed sup the (Loss of Weight Test) to determine the analility of a explosive or a propellant, is described in Kase-Mets (1946, p 246 gtc.

Globestoub (Flux Dust or Binet Furnace Dust), It was used as a component of liquid air explosives. Kast Hetz (1944);

Gleamine 43 (Glass mine 43).See under Landmisen and also TM 9-1985-2 (1955), p. 275.

Glide Somb (Gleichoube) in a atreamlined missile provided with wings and stabilizers to allow it to glide towards a carnet in free flight, after it is released from a place flying in approximetely begineated position:

The houth in used to actack targets at a greater horizoncal distance from the releasing plane than would be stracked

by normal bombs. \ This method of bombing is designed in order to keep the releasing plane out of the cappe of cases; AA-

A short description of principles of a glide bomb may.

be found in the following papers E.W.Spender, "Unternuchung der Seitenntabilität einer Gleitbombe mit einen automatischen Steuerung obne Vereilung". Zentrale: file "Wissenschaftliches Berichtwenen der Luftfahrtforschung des Generalluftzeugmeinters 3 (ZWB), Berlin-Aldershof. Forachungabericht Nr. 1919, May (1943) (Included are 12 references). Notes English exactation is available as Technical Memaccording 1248 of the National Advisory Committee ... her Aeronnutice August 1950.

Glycum Glycetlal See amoral section.

Note: According to M.L. Sheely: "Synthetic Glycetin", BIOS. Mincellaneous Report No 24, (1948), the Ludwigshafes Plant of the 1G Farbenindustrie annulactured synthetic alveerin during WW II by the "Five Stage Method", starting . from propanol, chlorine, Na carbonate and Na hydroxide.

A colorless, viscous, glycerin-like liquid consisting of about 35% glycols, 35% glycens, 25-28% henitel, environ and other compounds. It can be preed by continuous entalytic hydrogenelysis of sugar at 200 and 325 atmospheres. The detailed phocess, operated commercially at the Höchst Plant of IG Fathenindustrie, is described

Glycerogen was used as a substitute for alveerin in cellulour films, sausage casings, printing pastes, pharmacenticals ,ere and its airrated product was used as a substitute for NG in dynamites.

1. M.L. Sheely, Glycerogen, a Substitute for Glyceria, BIOS Miscellaneous Report No 23 (1948) 2. F.M. Turner, Condensed Chemical Dictionary, Reinhold, N Y (1950), p 320.

Glykel (Glycol) (abbrev here to Gc). See seperal section.

Glykelnitres (Nitroglycol, abbreviated to NGc). See general section.

winted on NGI | See seneral section under Glyceria.

Glynnein oder Glycnein (Glycerin, abbreviated to G), See general acction. Glynariatelateres adar Glycoriatrinitres (Nitrohlyceria.abler-

GM-1 (Liquid Nitrous Oxide), was used as a fuel booster for simplane engines (CIOS 23-18, n 5).

GP (Powder). A powdered sodium picrate combined with e binding agent such as feeten \$5 (copolymer of burndiene and seyrence). It was used as a propellant in Panzerinuse amountaine (CIOS 25-18, p 28).

"G" Pulver ("G" Propellent) (Known in the German Sir Forces as "K" Polver), it is a "cool" smokeless propellane developed before EVE by Gen thin Gallwitz and collaborate

Historical; The use of aicroglyceria (NG) propellance had the following disadvantages:

n' Glycerin needed as the starting material for NG was obtained in those days from food materials cooks fare and oils which were in short supply during the war, Note: With the development of synthetic methods of manuf of glyceria there probably will be so shormer in future

b) The manuf of NG propellants involved some danger to personnel, particularly during the rolling and ex-

cruding operations c) NG is comparatively a slow and paor relatinizing seent for NC:

d) NG propeliants are "hor", i.e. they have a high Kear of combination and a high flame temperature which results in a rapid erosion of the run barrel and a decrease in

its appricable life. Note: The marked effect of the heat of combustion on the gun barrel, (crossion), is shown by the following example: a gun uning a propellant with 950 heal/kg was good for only 1700 firings, while one with 820 heal/kg could stead

3500 firings, ... Due so whe above disadvantages of NG propellunts. work was started in Gelmany about 1934 under the direction of Gen U. Gallwitz to develop a propellant which would be less erosive than NG propellants and as the same time possess the high bullistse potential required for muzzle velocities of the order 3300 ft/sec. . ?

At first natroelycol (ethyleneglycoldinitrate) (EGDN) was creed as replacement for NG, but this proved unsuccessful due to the extreme volatility of EGDN even at moderate pemperatures: Then, in 1935, Gen Galtwick proposed use of hirrared "Folvelykol", & product essily available from non-lood materials, Polyglycol, which is a mixture of diethyleneglycoldinitrate (DEGDN), (called in Germany Diglykoll with a small amount of EGDN, was considerably less voiscile than straight EGDN and although it was more volatile than NG. 's could be used in moderate climates such as in Europe, it proved however, to be unsuitable for stopical climates, such as in Africa.

Polyglycol (or straight DEGDN) was a better gelatiniser for NC than NG, but the most important fact was that it produced considerably "cooler" (calonific value about 696 kcal/kg) propellance than it was ever possible to obtain with NG. The diminished erosion protonged the life of gun barrels to a much present degree than was expected. (See agest Eresies of the Base).

The new propellant was called \*G\* Pulver (G stands for

the first I free of Gallwitz).

Due to the fact that "Polyglybal" (or straight DEGDN) is a most pelaciniser for NC, it was jugaible to preparepropelleurs more honogeneous than NG propelleurs and with annother surface grains, blansfacture of "G" propellants. aspecially the rolling operation, was much tooier and lear designeous and se rolling flave (often observed in NG propellents) were observed. Another personage of G prescillants was that they permitted the incorporation, without becoming bristle, of materials which do not take part in the gulatiannotion, such as, K 'nulface (flash reduces), nicrogenmuline (MGe), orc (See also "Gedelpulver").

Being a good gelasininer, DEGDNmay word in smaller

markies then MG and in a wider mage. For instance. while the amount of NG should be 40-43% for optimum re-celled DEGDN may be used to the range of 20 to 43%, the remainder buing MC ambiliner (nuck un treatestion, or scardien) we set the following; prethance, phthalaces, flack sourcess (such as K sulface or MGs), vangline, graphice, Mg paide, sec.

One such propellages 61,53% of NC (blend of soluble and involute MC giving an average airrogen content 12.2%), 26.37 of DEGDN 7.50 of pthyle querality, 1,60 of vaneline, 8.65 of phehalote, \$.25 of Mg anide, 0.1 of graphite and 2.00% of E sulface had a calorific value of 690-700 heal/kg 

then MG (4-) times more Volatile) and in unmittable for

Page 100 (100) terms transpe had "study justs" "O" propulates design the Abricas Transpolar, Gen Gellurius propulates design the Abricas Transpolar, Gen Gellurius propulates design the histonest propulate (TRO), (celluri Trighylat, in Gentines), Tright asian tel product. (TEGON) was only alighdy more validile than MG (about 135 timen) and was quite suitable for het climates. The replacement of DEGDN by TEGDN permitted the production of propoliones with even lower calculie value than the ending "G" procellents. For instance one containing 56.55% NC (a bland with an average N courses of 12,2% 25.16 TEGDN, 12.00 other controller, 0.25 MaC. 0.10 smale he, and 4,00% E sulface had a calorific value of 650 kgul/ka

TEGON presents the pant advistages from the point of view of its minejaining properties as DEGON and liberine permiss the justiceperation of non-gelectainers such see K sulface and MGs.

"O" preprinces nee slow burning and are ufficient in wanpent /where is projectile truning in the barrel long enough for complete combustion of the propellant. All kinds of good large howitzers and metters are in this class,

All of these weapons have sufficiently long heirele for 'complete combustion of the power, "G" propullant in finhe form were found manimble, however, in medium and small caliber; howitzers and morners because a plojectile does not remain for a sufficient time in the barrel for complete combustion of the propellant. In these cases "Godol" patpellance were found to be quite suitable. (See also, "Gudelpulves", Erosion of the Bore and under Propeliners).

1) Use Gallwicz, Die Geschützladung (Propulling Chartel Housewooffennes, Berlin (1946) (English translation is

2) D.W.Scickland et al. General Summers of Fundamina Dis

PB Rept 925 (1945), p 13 and Appendix 9.3-90 3) H.H.M.Pike, Report on Visit to Discherg Factory of Di A-G , CIOS Rept 31-68 (1946), pp 4-5.

GRANATE (Gr oder at ). The turn "Granate" is used in Germany as a base were for various types of rounds. By adding a prefix and/or a suffix to the word the nuncr answer of the projectile is indicated, E g :

	Sparaggranete Spreaggranete 41	Sprage 41	HE shall for topered here gun
	Nebelgranate Geweitgraaste Headgranate Prantitgranate	Nhar Gerije Hdar Paar	Smoke shell  Riffe grenade Hand grenade Armor-pieccing (AP)
	Panaergranne 39	PH# 39	nhell APCBCHE (Amor piecing capped, halistic cap, high captenive) shell
	Pinnergenauce 40	Page 40	AP shell wish a tung- ucen carbide core
74	Pinamagements 41	Pear 41	AP shall with a teng- stru cathide care for tapared bore gos
4	Gawahanpeeng-	Gewopge	Antipersonnel sidio
	Geweinpenser-	Gemage	Astimak rifle . g.mode
	Gewahepropa- gandegranase	-	Propagação ziflo
	Gewehrfellschirm-	<del>-                                    </del>	Historian para-
	Granate Betan Granate Hehiladung	Gelle Gell.	Anticoncrete shell Hellow charge ghell 'a
	Comes Andlian	- 15 2	formation man be studied

German Artillary mundo of minorition Parmanagus ition and Kuruschmunition

A) Elekatramunition oder Petrotramunition (Oue-slace annualtion or carridge assumition). It is an assumition the complete round of which may be looked into the treapen in one operation. This corresponds to American lines ammunition. The complete round consists of a cartridge case, toutsining a primer and a propelling theres. The case "is personnelly estimed to the proincerte.

Eg: Rounds wood in AA gune, caliber 20 mm 28 mm; 30 mm; 37 mm; 40 mm; 42 mm; 50 mm; 75 mm; 86 mm; and 105 mm.

Note: The Germans designated the caliber of suns in consimeters but we designated them in willimeters in order to conform to the American neaction

B) Kartuschmunition oder Getreenremmitten (Separated cartridge amounition) in an amounition conductat intermediate between American ventifited and separateloading communition. It consists of a projectile which is placed into the weapon first and a cartridge case (containing a primer and one or neveral begs with propelling charge), which is loaded into the breach afterwards. The cartridge case is not fixed to the projectile. The number of burn with propellant could be varied according

to the range requirement, at the place of firms." Notes The Germans employed carridge cases for all their in order to prevent the escape of gases to the rear of the wearon when the brench is special; they never

and the rounds corresponding to the American aspurant loading ammunition.

The Kartuschenmunition was used in some 75 mm sounds no well as in 103 me, 150 mm, 170 mm, 210 mm, 240 mm 200 mm. and 353 mm year, or howitters.

The German Artilles projectiles as well as numerous capoured Austrian, Balgina, Casch, Dutch, Franch, Polish, Russaish, Russian and Yogonlav projectiles used by the Gemons during WW II are briefly described in TM 9-1985-1 pp 358-544. (See also Smoke Projectiles).

Following is the list of these projectiles, arranged by calibra together with the references to Th 9-198-3. 11 20 mm included: Oerlikon AP, Mauser AP, Solothurn AP.

Oerlikon HE. Manner HE and Solothum HE are described is TM 3-1985-3, pp 358-60

2) 26/20 um included; HE 2.8/2.0 cm SparPair and AP Page ased in Inpered Bore Gun, PaB 41 (pp 371-5) 3) 30 mm included: AP, HE, HE-T, AP with Core and Inere-Looded projectiles used in Solothurn AC Guan (pp: 379-82) 4) 37 am iscluted:

a) HE-T (3.7 cm Spgr L'opur) uned in Naval C/30 Gus (p 382)

b) AP Without Cap (3.7 cm Pxar) used in Pak (p) captured from the Polish (p 382) c) Rudded Somb (3.7 cm Stielgeman, 41) need in

Pak 41 (p \$83) d) AP Without Cap (3,7 cm Puge Past: 18) used in Fink 18 and Fink 36 (p 384)

e) HE (3.7 cm SourPatr '40), aned in Pak (p 185). f) AP Without Cap (3.7 cm Px at Patr) used in Pole

(p 306) a) HE (3.7 cm SparPatr-ung) - word in Pak (p. 386) b) HE (3.7 cm SparPatt C/30) word in C/30 Gus.

(n 388) 5) 40 mm included: HE (4, cm SpgrPntr), and HE-inc (4 cm Re Soge Post) weed in Flak 28 (po 380-9) 6) 42/28 mm included:

a) RE (4.2-2.8 cm Spar Parr L. Pal: 41) aned in L Pak 41 (Tapered Bose Gen) (p 374) b) AP With Core (4.2-2.8 cm Page Pate L Pak 41)

used in L Pak 41 (Tapezed Bose Gun) (p 574)

a) AP With Tungston Carbide Core Arrowhead Denim (4.7 cm Pagi Pate 40) med in Creck design tureses bere man Pak (t) and £36 (t) (p 375) b) HE 14.7 cm SparPatt 36) used in some Cauch daniga guris (p 350)

c) HE Asseries denigs [4.7 cm SparPatt (6)] noed in BShier K (3) (p 391) d) APC [4.7 cm Page Page 36-(t)] used in Casch

deales sees Fink 37 (c) and Pak (c) (p 392)

a) AP With Tungates Carbide Corn, Arrowhead Desim (5 on Past Past 40 KwK) used in the Tsak Gan, 5 cm KwK (p 376)

b) AP Without Cap () on PagePate KwK) saud in KwK (p 394) c)'HE (5 cm Spar Pair 38) mand in KWK 39 and Pak 38

d) APC (5 cm Prig Patr Ewk) used in the same gues as above (p 395) e) HE-Inc-T (5 cm Br SpgrPaix 41 L'apur) noud

in Flok 41 (p 397) 1) HE Mortus projectile uned in 5 cm LGr W 36"

9) 75 mm included:

a) AP With Tungsten Core. Acrowhead Design (7,5 um PagrPatr 41) used in the Antirack Gun.

b) HE (7.5 cm Spar Part KwK 34) and AP With Ballistic Cap and AP Cap (Pagr Patr 39 KwK 40) used in KwK, KwK 40, SnuG 40 and Pat 40 (p 398) c) HoC. Type 39 [7.5 cm GrPatr 39 (HD) ] used in GebK 15 (p 399)

d) HoC [ 7.5 cm Gr Patr 38 KwK (HL) ] used in KwK. StuG. KwK 40, StuG 40, GebK 36 and the Recoilless Gue for Airborne Troops (LG 40) (p 400) a) HoC [ 7.5 cm GrPatr KwK (HL/B) ] used in the

same guns as above (p 401) f) Smoke (7.5 cm Nbar Patr KwK) used in the annuguns as above (p 402) ' (See also Smoke Projectales) g) HE (7.5 cm GebG 15 Aluminium) used to GebE 15 (p 403)

b) HoC (745 cm les) used in LIG (8 and 1. Gel) IG 18 (p 404)

i) HZ (7.5 cm lgs 18 AZ/23 hA) used in LIG 18 and L Geb 16 18 (p 405) i) HE: (7.5 cm SpacPatt 75/50) used in Skeda

Dual-Purpose Gua to 406) k) HoC. Type 38 (7:3 cm GcPetr 36 HL/A) used in LFK 18 (p. 407) 1) AP | 7.5 cm Page 40 (W) Pak 40 3 used in Pak 40

(p 408) m) APC (7.5 cm PagePatt KwK 38) used in KwK; StaG. LFK and in Recoilless Gus for Airborne Тамора (р. 409)

a) HoC. (7.5 cm GrPate 38 HL/A KwK) used in KwK at 48. KwK-40. UFK 18: GebK. 36: SinG 40: Pak. 40: FK-16 and Recoilless Gun 40 (p.409)

b) APC:(7.5 cm Page 39 FES) used in Pale 4 40/1, 40/2 and 40/3 (n 410) p) HoC (7.5 cm GrPatr 38 HL/8) used in case

gene as given under (a) (p 411) r) HE (7.5 cm SparPett 34) used in Stult 40 (L./43). Stalk 40 (L/48) and Pale 40; 40/1; 40/2 and 40/3

(p 417) s) HoC (7.5 cm lg: 58 HL/A) used in LIG 18 and L GebG 18 (p 425)

s) Projectiles used in captured 75 mm Belgion, Dutch, Brench, Polish and Yugoslav gunt nes described. on po 410, 413, 415, 419, 420, 421, 423 and 425 of TM

0-10m5-11 10) 75/56 me was the Brandt Sabot projectile developed in France by E.Benndt (9 369)

11) 76.2 mm included, the following projectiles used in captured Russian weapons:

· 'a) HE (7.62 cm Spgr 284/4) used in Gehit 307(c)

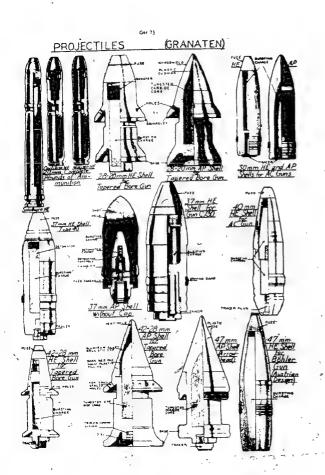
(m 426) b) HE (7.62 cm. Spgr Patt 39) - uned in FE 36 (r) and Pak 36(r) (p 426)

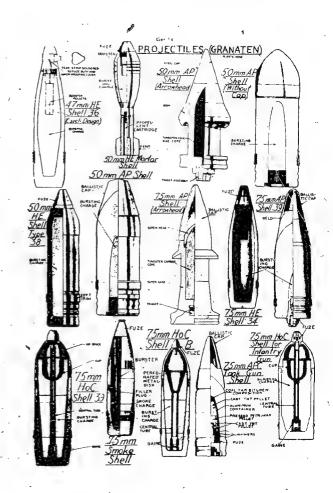
c) AP (7.62 cm PastPatz 40) used in FK 296(s) FK 36(r) and Pak 36(r) (p 427) d) APC (7.62 cm PagrPatr 39 rot) used in Pak 36 (r) to 478) · e) HE (7.62 cm Spgr 280/2) used in JKH 290(c)

f) HE (7.62 cm Spgr 284/4) lused in GebK 307(c) (p 430)

a) HoC (7.62 cm Gr. 38/2 HL/B) used in IKH 290 (r) (p 430)

h) HE (7.62 cm Spgr 39/2) used in JKH 290(r)





12) 76.5 mm projectiles were used in captured Austrian, Czech and Yugoslav 7.65 cm weapons (pp 432-435) 13) 80 mm included:

a) HE Mostar proj (8 cm Wgr 36 and Wgr 39) used in wGr₩ 34 (p 529)

h) Colored Smoke proj (8 cm Wgr 38 Deut) uned in aGrW 34 (p 533). (See also Smoke Projective) c) HE, Smoke proj (8 cm Wgr 34 Nb) uned in Morter,

MGeW 34 and KaGeW 42 (p 532) 14) \$3.5 mm included: 8.35 cm Page(t) and Ge 23/20(t) used in captured Caech AA Gue, Flak H/2 2(t) (pp 436-7) 15) 85 mm included:

n) APC (8.8 cm PagrPatt 39) used in Fink 41 (p 438) b) HE [ 8.8 cm Spg Patr L/4.5(Ku) ] used in Flak 18 Flak 36 and Flak 37 (p 638)

c) AP (8.8 cm Page 41) used in Flak 36 and Flak 41"

4 AP with Tungaten Carbide Care, Type 40 (8.8 cm Page 40) used in Fink 36 and Fink 41 (p 439) e) HE (9.8 cm Spgr Paw(L/4.7 FES) used in Flak 41

and Fink 63 (p. 441) t) APC (8.8 cm Page Peer mBdZ) used in Flak 18. Flak 16 and Fink 57 (p 641)

g) HE, Type 43 (8.8 cm SpgrPaw 43) used in Kwk 43, Stuk 4> (L/71) and Pak 43 and 43/71 (L/71)

h) HE (8.8 cm Page 39/43) used in Pak 43 and Pak 44/41 (0 442) 1) HE (8.8 cm Spgr Flak 41) used in Fink 41 (p 443)

i) HoC (8.8 cm GrPost HL) used in KwK 36 (L/56) (p 4441 b) HE (8.5 cm Spgr L/4.5) used in KwK 36. Flak

' 18, Flak 36, Flak 37 and in Medified Russise AA Gun 8.3/8.8 cm Flak 39 (r) (p 444) 1) HE, with Controlled Emganestation (8.8 cm Spgr

L/4.5 ZiZ) used in KwK 36 (L/56) (p 445) m) AP (8.8 cm Page) used in Flak 18, 36, 37 and in Flak 39 (r) (p 446)

a) AP (8.8 cm Page 39/1) med to Pak 43, Pak 43/41 (L/71) and Stulk 43 (L/71) (Self-prope lied gum) (p

o) AP (8.8 cm Page 39) used in Fink 18, 36 & 37, KwK 36 (L/56) and in Flak 39 (r) (p 448) p) Incredincy Shrapeel (8.8 cm Ge Br Scht Fielt) used

in Fink 18, 36 and 37 (p 448) 16) 100 mm included:

a) HoC proy Type HL/B and Type HL/C are de-acribed in TM 9-1985-3, pp 450-1, but their mass AM DOC LIVER

b) HE Cauch proif 10 cm Dopp 2Ge M 21 (t) ] wand is captured Carch, Polish and Yagoslav Light, Field Houstages (p 451)

c) HE Yugoslav peop [ 10 cm Spgr Dopp Z 311 (j) and Spgs (AZ) 310 (1) ] used in capsued Czech, Polish & Yagoslav Light Field Howitzers and Mod 28 Yuzonlav Mountain Howitzer (9 452)

a) HE Czech proj [ 10 cm DoppZGr 30 (r) ] used is Carch, Polish and Yagoulav Light Field Howstau.s (p =53)

el HE Polish pers \$ 10 cm StgGr (p) 'used in Czech, Polish and Yugoslar Light Field Howstawn (p 455) f) HE German proj (10 cm 5pgr 38) uned in Czech, Polish and Yuspelsy Light Field Howstness (p 454) g) HE Morenz pros (10 cm Wgz 37) uned in NoW 35 (P 533)

17) 105 sem included

4) HE (10 cm Gr 19) used in K 18 (9 4561 b) HE used to K 17, 04 nA and K 17 (p 45") c) AP used in several Light Field Howitzers(pp 4)? and 459)

d) HE (10 cm Spgr L/4.4) uned in Flak 38 (p 407). 4) AP-T (10 cm Page tot) used in Fluk 32, Flak 39, aK 18 and aKT (p 468)

f) AP (10 cm Page tor L'spur) used in Light Field Howitzer (LFH 16). (p 470)

g) HE used in Light Field Howitzer LFH 16) (p 471)

b) Smoke used in Howitzers (LFH 16, LFH 18, LFH 18MB and SruH 42) (p 472)

i) HE for Long Distance Use in Light Field How-

itzers 18 with Muscle Brake (LFH 18MB) (p 473) i) HoC Type A, HoC Type B and HoC Type C used in the same Light Field Howitzers as listed under (h) (pp 474-77)

k) HE, Model 15, Model 23 and Model 28 used in the 10 cm Skods Howitzer (pp 477-60)

1) HF (10 cm Sper Patr L/4.4 Ku) used in Flak 38 and Flak 39 (p 480)

m) HE (10 cm Gr.19 Kz 13) used in sK 18, KT and IgKT (p 481)

n) HE proj with disintegrating band so described

briefly on p 369 of TH9-1985-3

p) Projectiles weed in captured 105 mm Belgina, French, Polish, Russian and Yugoulav guns are described on pp 459, 461 and 463-467 of TM9-1985-3 n) HE (10 cm FHGrStg mR 11) used in Light Field Howitzers: FH 18, FH 18/1, FH 18/2, FH 18 -M. FH 18/39 and FH 18/49 (p 536)

18) 122 mm included HE projectile 12.2 cm Spg: FEW(i) used in captured Russian guns K 390/1 (r) and K 390/2 (r) (p 481) 19) 128 mm included:

a) HE (12.8 cm Spar Past L/4.5), described briefly on p 482

b) AP (12.8 cm Pagr FES) used in Flak 40 (b 483) c) AP (12.8 cm KPS) used in Flak 40 (p 483)

d) AP (12.8 cm Page 43) used in Flak 44, selfproperled (p 484) 20) 150 mm included:

a) HE With Disinsegrating Beads, Sabot Type (p 370) b) HE [ 15 cm AZGr 37 (t) ] weed in Czech Medium Howitzer # FH 25 (t) (p 485)

c) HE (15 cm KGe 42) used in K 18 (p 486) d) HoC (15 cm Jgr 39 HL/A) used in Stull 481./12)

and s (G 33 (p 486) a) A/C (15 cm Gr 19 rot Be) used in K 18 and K 39

(0.487) f) Crech projectiles, such as 15 cm GrM 25 (t) (n 488), 15 cm AZGrM 34 (t) (n 488), 15 cm MinGt M 13/19 (t) (p 489), 15 cm MasGr 28 (t) and 15 cm MinGr

M 28 (t) (p 490) used in captured CzechField Hawitzg) HE (15 cm ]gr 38 FES) used in the Assault Howstate Stull 43 (p 491)

h) AP (15 cm PxSpgr L/37 milbe) used in K 18

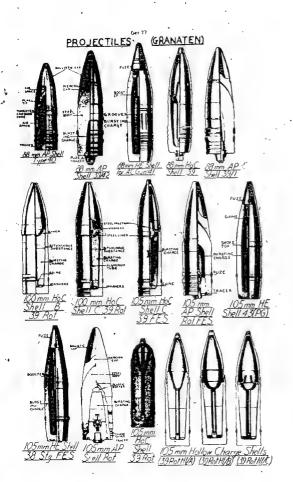
i) HE (15 cm Gr 36 FE3) used in sFH 18 (p 492) 1) HoC (15 cm Gr 19 HL) used in sFH 18 and sFH 13 (p 492)

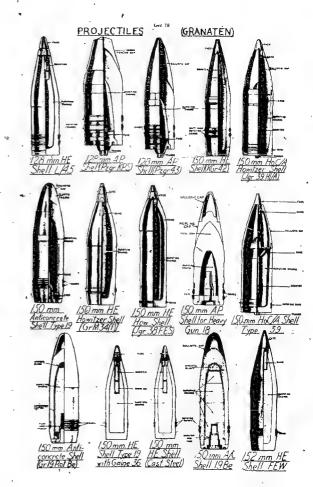
k) A/C (15 cm Gr rot Be) seed in K 18, K 39 and in K (E) (p 493) I) HE (15 cm Gr 19m Zdla 36) used in aFH 18 (p 494) m) HE proi of case seed (15 cm Gr 19 Stg) used in

#FH 18, #FH 13 and #HT (p 495)

n) Smoke (15 cm Gr 19 Nb) used in uFH and sFit 13 (p 497)

PROJECTILES (GRANATEN)





o) Smoke (15 cm [gr Nb) used in alG 33 (p 497) (See also Smoke Projectiles ! p) Rodded Bomb (15 cm Stielgranste 47) used

\*1G 33 (p 498)

s) HE (15 cm Gr 18) used in aFH 13 (p 500); HE (15 cm ] gr 38) uned in siG 33; HE with Base Fune and Bailistic Cap (15 cm Spg L/4.4 Bd Z mir Hauba) used in Ki Mrs Laf (p 504); HE with None Fuze (15 cm 5pg L/4,6 Km) used in K39 (p 504).

a) SAP (15 cm Hpage) used in K 39 (p 504) t) AP (15 cm Page) used in K 39 (p 504) u) Smoke (15 cm Gr 38 Nb) used in #FH 18 (p 506) v) A/C (15 cm Gr 19 Be) used in sFH 18 (p 507)

w) APC projectile for unknown weapon (p 509) x) Rocket Assisted Projectile(15 cm RGs19) (p 509) 21) 152 mm included the following types used in

captured Russian weapons: a) HE (15.2 cm Spgr 436) used in KH 433/1, (r) and XH 433/2 (r) (p. 510)

b) A/C (15.2 cm Gt 434 Be) used in the same weapons as above (p 511)

. 22, 155 mm included the following projectiles used in captured French (f) and Polish (p) Wespons a) HE [ 15.5 cm StgGr 422 (f) ]used in K 418 (f),

% 419 (f) and K 420 (f) (p 512) b) Smoke [ 15.5 cm Gr 427 (1) ] used in K420 (f)

(a 512) (See also Smoke Projectiles) c) HE [ 15.5 cm Gr 417 (I) and Lange 415 (I) ] used in sFH dia (1) and sFH 17(p) (p.513-4) d) HE [ 15.5 cm Gr 421 (f) ] used in 15.5 <m

K 420 (f) (p 515) 23) 170 mm included:

a) HE(17 cm KGe 38Hb) usedin Ki Mes Laf (p 516) b) HE (17 cm KGr 39) used in Ki Nes Laf (p 517) 24) 324 mm included the HE proj [ 19.4 cm StgGr '486 (f) used in captured French Railroad Gua, K(E) 486 (i) (p 517)

25) 200 mm included the HE Mortar Projectile 20 cm Wgr 40 (p 534)

₹ 26) 203 mm included: a) A/C [ 20.3 cm G: 503/2 Be (t) ] used in captured Russian Heavy Howitzells H 503 (c)

and H 503/2 (r) (p 519) b) Flare projectile (20.3 cm Learnigt) used in K(E) (p 520) (See under Flares) .

c) HE [ 20.3 cm Spgr L/14 Kz (Hb) and Spgr 1/4.7 Ka mHb used in K(E) (p 521) d) SAP (20.3 cm Spgc L/4.7 BdZ mHb)'used

in K(E) (p 520) 27) 210 mm included A/C proj (21 cm Gr 18 Be) used in Mrs 18 and in 1g Mrs 18 (p 522)

28) 240 mm included: a) HE (24 cm Spgr 1/4.5 BdZ mHb and Spgr \_L'4.2 mHb) used in Theodor Bruno Radway,

Gua, ThBrK(E) (p 524) b) HE (24 cm Gr 40) used in Czech Heavy Gun, sK(t) (p 525)

291 280 mm included: a) Rifled 28 cm projectile, its comenclature and uses are unknows (p 516)

b) SIF. Rocket Assisted Rifled proj (28 cm RGs 413 and Gr 351 used in K 5 (E) (p 527-28) 30) 35\$ mm included A/C project (35 cm GrBe) for

how, (zer Milp 129 (Its caliber was also given as 355 mm) 311 380 mm included HE Moriat prof (38 am Wgr 40' and Smoke , to 138 cm War 40 Nb/p 59%

American and British Abbreviations. AA Antiaurcials, AC Aircraft, & C Unticoncrete AP Amor preteing; APC

Armor-prercing, capped; HE High-explosive; HoC Hollow charge; Inc Incendiary; SAP Semi-atmorphering; T Tracer Germon Abreviotions: See Abbreviations at the end of this German section. 9

Reference: Anon, Technical Manual TM 9-1985-3 (1953), PP 158-544

The same information is given in the following references: 1) Agon. Enemy Var Materinia Inventory List, Ammunition, Supreme Hendquarters AEF, (1945), pp 1-154

2) Apon. Recomitton Handbook of German Ammunition, Supreme Headquarters AEF (1945)

3) Amon, German Artillery Projectiles and Fuzes, Ordnance Bomb Disposal Center Aberdeen Proving Ground and 'U'S Navy Bomb Disposal School, pp 1-177 (No date).

Note: According to Ref 1, pp 131-3, the following larger callber projectiles were used by the Germans: 380 max HE and AP for 38 cm Slegfried Konene C74; 406 cm HE and AP for 360,6 cm Adelf Kenene or for Navy gan, Schiffakonone C/34; 420 mm HE, Anticoncrete for 42 howitzer, called Korl Morser; 540 mm HE for 54 cm heavy howitzer, called Korl Morser; 615 mm HE for 61.5 cm heavy howitzer, called Korl Gordt and 800 mm HE for 80 cm superheavy gun, called Sevestopol or Gustev Geschütz.

Granges Hand and Granate Gawahr (Hand Granade and Rille Grenade).

The following types of grenades are described in TN 9-1985-2 (1953), pp 319-345:

1) Stick Head Grenades, Models 24, 39 and 43 (Stichlhandgranaten 24, 39 und 43) (pp 319-20) 2) Egg Type Hand Grenade, Model 39 (Eierhandgranate 39) (p 321)

3) Shaving Stick Offensive Hand Greande (p 322) 4) Magnetic Antitank Hand Grenade, 3kg. (Hafehobiladung graunte, 3kg) (p 323)(See Hafthohiladung) 5) Hollow Charge Stick Type Hand Grennde (p 324) 6) Antitank (Hollow Charge) Hand Grenade (Panzer-. wurfmine) (p 324)

7) Smoke Hand Grenedes, Models 39 and 41 (Nebelhandgrannten 39 und 41) (pp 325-6)

8) Smoke Hand Grenade 14 (Bleadkorper 14) (p 327) 9) Smake Hand Grenade 24 (Blendkörper 24) (p 328) 10) Smoke Hand Grenade, Egg Type: (p 329) 11) Hand Smoke Signal, Red (Hundrauchzeichen-

Ret) (p 329)

12) Lacrymatory Hand Greande (Tent Bomb) (p 330) 13) 46 mm Antitunk (Hollow Charge) Rifle Greande (S.S. Gewehrpanzergranate, 46 mm) (p. 331)

14) 61 mm Antitunk (Hollow Charge) Rifle Grenade (S.S.Gewehrpapzersrangte : 61 mm) (Two types, pp 331 and 332).

15) Antipersonnel Rifle or Hand Grenade (Gewehroder Hand- Sprenggrammes) (p 332) 16)" Apritank (Hollow charge) Rifle Grenade

(Geweht Pauzergrannte) (p 334) 17) 37 mm Antitank (Hollow Charge) Stick Grenade

18) Large Antitank (Hollow Charge) Rifle Grenade (Grouse Gewehr Panzergrauste) (p 336) 19) Hollow Churge Rifle Grenade (Schuss GgP 40)

(p 337) y 20) Propaganda Rifte Grenade (Gewehr Propagandagranate) (p. 138)

21) Illuminating Parachute Rifle Grenade (Gewahr Fallschirmleuchtgranate) (p 339) 22) Hollow Charge Grenade, called Faustpatrone

(p 339) . 23) Pintol Grennde (Wurfkorper Leuchtpintole) (5 340)

24) 27 mm Pistol Grenade HE Egg Type, fired from a Walther pistol (p 341)

Ger 80 PROJECTILES (GRANATEN) 25) 26 mm Pistol Grenade (26 mm Wurfgraustepatrone für 326 Lauchtpistole) (p 342)

26) HE Cartridge for 27 mm Pistol Grenade (Sprengpatrone für Kampipiatole) (p 343)

27) Hollow Charge Signal Piatel Grenade (Panzer-

wurfkorper 42 Leuchtpistole) (p 344)

28) 27 mm Message Pistol Grenade (p 345)

29) 27 mm Multistat Signal Cartridge for Piatol (p 345)

Several of the German grenades were examined at Picationy Arzenal, as shown by the following Paierences:

1) A.B.Schilling, Pic Aren Tech Rept 1460 (1945) (Offennive Hand Grenade, Egg Type)

2) A.B.Schilling, ibid, 1467 (1945) (Hand Greende, Stick Type) 1) A.B.Schilliog, Ibid, 1494 (1945) (Hand Gredade

and Rifle Grenade for use in the Mauner Rifle Grenade Discharger)

4) F.G.Haverick, ibid. 1507 (1945) (61 mm Rifle Grenada)

5) F.G.Haverlak, ibid, 1509 (1945) (46 mm Rifle Grenadel

Note: A brief description of pietal and rifle groundes in given under P and R .

Great Engles or End. One of the guided (directed) missiles used by the Germans during WW II (See also Enzian, under Cuided Missiles). Reference: TM 9-1985-2 (1953). pp 229- 26.

Granada. See Granate Hand und Granate Gewehr.

An "monized" aluminum powder consisting "Grings". of small spherical particles. Its density was about twice as high as for Pyroschiff (q v ) .It was used in pyrotechnic compositions.

Referencer Dept of the Army TM 9-1985-2 (1953), p 82. "Gringly Bear", See Brumbur

Groben Bluttchengulver, Large Grain Smokeless Probellant formerly used in larger caliber German guns is described in Daniel, Dictionaire (1902), p 364. Grundlading (Base Charge). This term applies to the base (main) charge of a bleating cap or a detonator or to a special ignition charge mentioned under Ignition. it does not, however, apply to the main charge of a pro-pultant, which is called Housekertusche (See also under Cordite Charge Casings)

G-Sals is one of the names for Nitroguanidine, also colled Niga; it is abbreviated in this work as NGu.

Gudelpulver (Gudol Propeltant), invented in 1937 by Dynamit A .G. may be considered as a G Pulver (DEGEN-or TEGN propellant) in which a large amount of nurvausaiduse (NGu) is incorporated.

As G Pulvet is slow burning in comparison with NG people lance, it was found unsurrable for use In medium and small caliber morrars, and howizzers. This is because the barrels of these weapons are "no short to permit complete combustion of the G Pulve while the projective is still in the sun barrel. In order to obtain satisfactory results in such weapons, the rate of comparison of the propellant should be higher than in the regula. G Pulver but at the seme time its tlashlessness should be low. This can be

achieved by incorporating into the G/Pulver some nitroguanidine (NGu). -

Due to the fact that ditrated glycols contained in G Pulver are good gelatinizers for NC, comparatively, large amounts of NGu can be incorporated without making the propellant too brettle (NGu is not a celatinizer for NC and is not gelatinized by nitrated slycula). In order to have a propellant of good performance, the crystals of NGu should be short and fine and uniformly distributed throughout the gave of the propellant. This was accomplished in the following

After preparing the nitrocellulose - dinitrodiglycol for dinitrotrialycol) jelly by knesding in a Werner-Pfleiderer apparatus, short fibered nitroguanidine

was pradually added and thoroughly incorporated. Then the mass was rolled for about 25 minutes

and the resulting sheets cut to the desired size. Following is an example of a flake Gudolpulver suitable fo. howitzers: NC(N=13%) 38.03, DEGDN 11.12. NGu 30.03, acardite 0.50, MgO 0.25 and graphite 0.10%

Nitroguaniding was also found to be suitable for incomposation in cool tubular cannon propellants, as Tor instance: NC(N=12%) 39.48, DEGDN 16.92, NGu 30.00, ethylphenylusethane 5,00, diphenylusethane 4.25. a nitrate 4.00, MgO 0.25 and graphite 0.10%.

Other formulations of NGu propellents are given under Propellages.

Among the advantages of NGu propellants may be cited: law eronion of gun barrels and practically complete absence of smoke and muzzle and breech flash. This was achieved without addition of any

flash reducing agents such as K SO... AA guns or those used on atmored vehicles, the problem of breech flash became of utmost importance because the breech has to be opened immediately after each firing and less time is given for cooling the chamber gases (than in the case of slow-fising weapons. It should be noted that modern tapid-fire weapons s provided with semi-automatic breech closures and muzzle brakes. The brakes tend to retain the gases back in the backel and when the breech is opened, the gases emerge in a glowing condition, endangering the lives of the personnel and are capable of igniting any combustible or explosive substance in the vicinity. With Gudol propeliant this breech flash was practically eliminated, (See also "Flash Reductants in German Propellants").

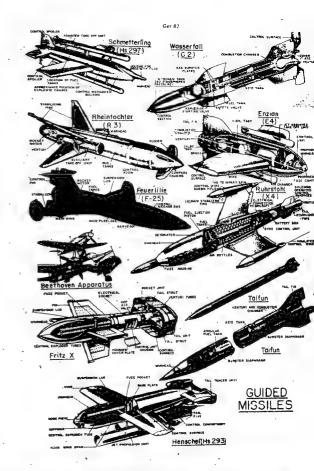
References: 1) U.Gallwitz, Die Geschützladung (Propelling Charge). Heereswaffename, Berlin (1944)

2) O.V.Stickland et al, General Summary of Explosive Plants, PB Rept 925 (1945), Appendix 8.

Guhrdynamir. See the Swedish Section ...

Gunrhellhofit. An explosive prepared about 1880 by mixing Lieselsuhr with nitrobenzene and fuming nitric seid [ Colver (1918) p 143 ]

Guidance Systems for Missiles. The principal German devices for guiding space-traversing numeroned missiles which canted within themselves the means for controlling their flight paths, are listed below and in some cases briefly described in References 1, 2 & 3. The systems may be subdivided into the following groups:



those the conding to Ref. 2, pp. 216-19 a 229, the original feeture the conding to Ref. 2, pp. 216-19 a 229, the original feeture the conding systems was called Keenjeh and the later recognition from the condition of the condit ol which was ren to a single stage supplifier and weaky couper. The assembly was mounted at an angle of about 50° to the axis of the body and the sound passed into the disphraga through a series of sure meah access which served to attenuate differences of air pressure due to neutron but not the sound of motors and propellers of commy sircrafts. A small lyre strengement was attached so the vibrating system in such a way as to broaden the mechanical resonance curves of the individual components of the system. If the missile, such as an X-4 was boming meanatean recommend curry; or me motivation, considering of the system. If the missific, such as a missification of the system is the considering consistent of the system of n light displaying actuated inchasism which responded to the sound of yingless people as a range of 15 maters. It was conserved on the same principal to the same of the sa

tion Cooleman System. This was exagentially similar to a frogerings qualite guidance. As with a pan for suchase filey, a missile such as a V-2 (A=0), was shared in the desired interval of the control o the motor. For courol in aximuth, the external and internal vanes, were interjocked but they, were no connected as to permit separate control in pitch, (Ref 3, pp 36-8 as to

583-47

regulated in flight by fins which were positioned by bydmulic servo-mechanisms controlled by an elaborate intelligence system. This system consisted of:

Two gyroscopes to provide scability about the three axes or the missile

b) Radio (optional) to provide azimuth control by flying

c) Radio or integrating accel-rometer for turning the motor at a specific velocity, to provide range control d) Time switch control to bead the missie over toward the target after it was launched vertically.

After elaborate preparations requiring much time, personnel and equipment, the V-Z was fired vertreally itom a metallic launcher. A few seconds after the V-Z was in that sir, the time switch control caused the missile to beed gradually over in the direction of the target. After to been gradually over in one direction or the target, niter I minute of flight, the motor was turned off leaving the missile at about a 45° angle and having a velocity of about 3,400 mph. For the remainder of the flight, the V-2 followed

the trajectory of a free body in space seaching a maximum height of about 30 miles before returning to the surface of the earth. About 5 minutes after take-off, the V-2 struck the earth some 200 miles from the launching site with a reiocity of approximately 1,800 mph causing the warhead and any remaining tighting explode C. infrared (IR) Geranica System consisted essentially

of a concave narco directed toward a target entating the infarred sendatation. A rocating date and a photocell-connected by a wire to a mechanism requismed the district of the control of of a concave mirror directed toward a target smitting

simple, rugged and reasonably reliable; in this system the azimuth was controlled by a magnetic compans, the altitude by a barometric altimeter and the tange by an air mileage menauring unit. Prior-to hunching the minasie, the devices were manually set for the desired course, skittude and range. The compans was linked to the disce-tional sproscope, whereas the altimeter, acted directly on she levator control system. All of the controls and amplificets were preumatic and the high-pressure air was stored in two tinks. When the predetermined range was reached in Highr the warhead was actuated and acmed. The controls were then locked causing the missale to dive. The accuracy of the remainal portion of the flight depended upon the balliance of the musule. (Ref 3, pp 35-36, 327-8 & 335-7). For more information on guidance systems for V=1 see Ref 2, For more information on guidance systems for V-1 see Ref 2, pp. 207-9, Some V-1 bombs were equipped with sone-tube radio transmitter for enabling the leanching crew to follow cities thights with direction finding suppress in order to obtain plotting and wand data (Ref 2, p 700)

E. Reder Guidance System or Redio Detection and Guidance System was not sufficiently developed to be used on a wide scale. Radar tracking of the maget was used for guiding the Vasserfall and Rhemtochter misertes (Ret 2.

of a radio receiver (located in a missile), a missile tracker and a main manamitter (focased near a missile launcher) and a radio transfer uncomen to the receiver. This system was used in the majority of German guided missiles in-cluding the PC 1400 RX Glider Bomb (Ref 2, pp 495-6), Hs 117, called also Schmetzerling (Ref 2, p 196 & 199). Hg 117, called also Schmetterling (Ref 2, p 7 95 & 1999), a 25 A-1 (het 2, p 2 10 & 20 5), as 290 (het 2, p 2 10 d), a 20 5), as 290 (het 2, p 2 10 d), a 20 5, as 290 (het 2, p 2 10 d), a 20 5, as 20 5, as 20 6, as 20 6

The following German radio controlled systems are listed or briefly described in Refs 2 and 3:

red of tracily described in Acts 2 and 3:

Bengand system; consisted of an optical (visual) missale tracker, "Anipped, with a joy stack courtol, a radio-receiver Sweasbear and a 'transactior, Red'i. The Stressburg McIll combination was said in the PX-1400 glider bomb. Schmesterling (Hs 117) rocker, Wasserfield (C-2) vocted and Green Enziam rocket (Ref 2, pp 13-4), 273 & 232 and Ref 3, pp 13-6).

Note: As a substitute for the Strassburg-Keld command link, the Krun-Brigg system was developed late in W-II

(Ref 3, p 41)

p 41) Eleas system was similar in operation to the Burgund's, except that radar tracking of the marget teplaced the optical tracking, fr was proposed for use with the Rheintochner 3 and some other missisies (Ref 2, p 227 and Ref 3, p 41)

c) Some radial guidance system was based on the method which a pavisaror of a ship uses to determine its position by plotting the reverse branngs obtained its position by plotting the reverse bearings obtained from the radio; transmitters of two knows locations. The device Some was more complicated than the systems used in sall; navigation, A brief description of the principles applied in the Some is given in Ref. 3, p. 397. d) Frienticke & Napiner mado receiver, first mounted on a Hs 293 missule proved to be too heavy and complicated for use, it was replaced by the Sters radio

on Strength (no. 1.59) is the first than the first

(a) Köppe melio control system designed by the Tele-funken Co was intended for use in Enzian massiles

(Ref 2, p 232) G. HIM Community substance Systems. Owing to the fact that saids command guidance systems are susceptible to electronic consecurious area (naming h) a control by wires was developed. The systems was installed in the X-4 six-niz missalle and with planned to be installed on the X-7 metage-to-nic missalle and own (nameho missalles (AR Z. Pp 20) a 216-17 and Rel 3, p 41). The wire links system was effective over about distances without less of enemy

conntensessures.

According to Ref 2, p 217 the wire controlled system used in the X-1 missile consisted essentially of a small optical joy-stack control target tracker mounted in the opiness joy sixes toutest wires and a receiving unit in the manule consisting of a gyroscope and a pair of relays. me manuale commissing of a gyroscope and a pair of relays. The control unit is the plane contained two revolving drams, one of them controlling azimush and the other elevation. The control wars consisted of two insulated on the control wars consisted of two insulated of two ins ni pir urmad Swedush spring-rised, virus 6000 m in length, and 0.227 min Jailmenter, Lei urcivirus justi in the insente consisted of a polarized relay for azimuth control and an anapolacized marginal telay for elevation control. The first tasky responded only no polasity, changes in the direction of current flow through the write valid in the marginal relay in the control of the elevation control signals were transmitted simultaneously over the same pair of wires. The telays were connected to the spoiler solutioned in the tail fine, shrough the gree communior system. This arran general converted the left-right and up-down signals into the proper pulses which were

and updates signals into the proper pulses which were fad to the solveoid a fermious, the spollies: The power supply consisted at a small 9-volf dry\_hattery located in the airctroop of the missille. Note: The mechanical difficulties encountered in earlier models were solved by paying out the view tools are proposed to the control of t

simultaneously (such as the Mr. 202 Highler, plane), According to the description given in Ref. 3, pp. 41-2, the leaseching and guiding of the K-4 missile were conducted as follows:

1) The missile was sined and launched from the parent

2) Simultaneously with this, sections of wire were ejected by means of black powder charges located in the wire ten by means on blass powers canages locates an aw warpools, one in the ampliant, another in the missile.

Then lesgth of insulated steet wire in-each spool was
12 har and there were the additional steels containing
18 has of wire located on opposite was tips of the X-4
3) Immediately after launching the X-4, the gyroscopic
astepilos (located in the missile) was put into operation, forested of Contract in the minus[2] was your into operations the washed became aread for easily deceasation and lasers (Lectured on the wing tips of the X-1) were quired [A. An the X-1] were proposed to the proposed of th

nation problem and a single gyro was sufficient to properly orimat the pitch and yes signals as the missile

6) To prevent the inductance of the wire on the spool from discorring the command signals, one continueter of impulscion of sact turn of wire was removed in order

implacion of mach twee of wire was removed in order; on occasion about food in wholes and occasion restricted the maneuver hilly; of famoching planes and required the maneuver hilly; of famoching planes and required that they remain in the "citizing of similar, has exposing themselves to the weapons of enterey's bothers, the state of the control of

sthdraw stacif beyond the mage of enemy bombers weapons.

The following varieties of wire command links systems briefly described in Ref 3, pp 41-2: ",

a) Dortmund-Dulsburg system consisted of an optical

'joy-suck control unit, a manamitting unit, two spools - ith wires (as described above) and a receiver located in the furniage of X-4. The transmitting equipmen cognisted of an oscillator (operated by pulses from consistent on an oscillator (operates or pulses, from the joy-stick control); and an audio power amplifier which transmitted two audio-frequency signals through wires to the receiving set in the missile. The audio signals were demodulated by the rebeyer to pperate two polarized relays, one for pitch and another for

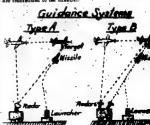
yaw control t
b) Decen-Detroid wire command link was a simple direct-current device which employed no vacuum rubes.
The simula were transmitted to the receiver, which consisted of three relays. The lat relay was sensitive consisted of three relays, like list relay was sensing to the polarity of he direct current signals (pitch control), the led relay was sensitive in the septimization of the signal for recomption to the control, the led relative to the remaining stress sensitive to the relative to the resolution in this case, the similar business of follow the course of the last command received. system except that insulation was not removed, since it was essential to this system to keep the resistance of wires constant. Near: In all wire control systems, the fall of wire so the parth proved to be a numbers and a bauard.

L.E.Simoni German Research is Vocid Var II. I.Wiley.

NY (1947)
2) Asson, German Explosive Ordanace, Dept of the Army
Technical Manual, TM 9-1985-2 (1959), Washington, D C
3) A.5.5.ceke, et al., Galdance, Yan, Kostmand, NY (1953)
(Vol 1 of series edited by G.Merrill and venticled: Principles
of Guided Messile Dessipa.

None: According to the K.W.Getland's book, Development of the Guided Méssile's (Filiph: Publication, London (1932), pp. 10-10, pp. 1

as there are the second of the control of the second of the second of the control of the control



Guided Mingile (Gentenerte Genchone). Beginnin mut 1948 neveral successful guided missiles wer developed at Personande, Yolkearode, etc. One the first German guided missiles was the Rhoinbei (Rhein Menannger) (Ref 2, p 34).

Differ successful guided missiles were:

a) Schmetterling (Butterfly), elso known as the

Hs-117 (Ref 2, p 35)
Note: He is an abbreviation for Henachel, the name

of the builder

b) hasserfeil (Paterfall) (Ret 2, p 37)

c) Rhontochter (Daughter of the Rhein; secies such as Rheintochter 1, 11 and III (Ref 2, p 40)

d) Enzien (Gentian, a species of blue flower) series, ranging from E-1 to E-5 (Ref 2, p 43 Ref 3,

p 99)

a) Focusitis (Fire Lilly) series, of which the Hecht (piks) was one of the first successful, T-Stoff and Z-Stoff ware used in it. The Hecht was succeeded by the Fruerillie F-25. The last of the series was the F-25, used only for research

(Ref 2, pp 45-47, Ref 3, pp 95-6)

f) Backson 8P-20 Munter (Viper) (Ref 2, p 47)

g) Rubrasch! (Steel-of the Rubt) series can from

X-1 to X-7, of which the X-4 was the most important

(Ref 2, p 50 and Ref 7, pp 90-2)
h) Ma (Herachel, the name of builder) series, including the previously mentioned Hs-117(Schmer-

including the previously mentioned Hy-11/(Scamerterling), as well as Hu-117H, Ha-293, Ha-294, Ha-295, Ha-296 and Ha-298 (Ref 2, pg 52-54 as 54-60, Ref 5, pp 92-3)

i) First X (FX-1400), a glide bomb (Ref 2, p 55)
i) Besheven Apparette - an odd-looking guided

missile (Ref 2, pp 61-62)

k) BY-246 (Ref 2, p 63)

1) Y-2, is briefly described separately under Y-2.

It could be launched as a guided missile m) Antipodel Bomber (Ref 4, pp 57-58)

a) Tulbon, a biliquid rocket (Ref 5, p 223).

Research 1) Acon, Army Ordonnoe' 31, pp 28-30 & 121-24 (1946)
2) F.Ross, Jr. Juided Missiles, Rockets and Torpedons, Lotchrop, Lee & Shepard Co. lac, N Y (1951).

pp 14-66 .
3) A.Ducrocq, Les Armes Secrètes Allemandes,
Berger-Le-rault, Paris (1947) pp 90-99

4) K.W.Gailand, Development of the Guided Missile, "Flight" Publication, London (1952), pp 2-19, 47 & 40-19

5) Anon, Dept of the Army Technical Manual TM 9-1985-2 (1953), pp 195-233

Note: Additional information on guided missiles, also called Directed Missiles may be found in the following CIOS Reports: 28-56, 29-45, 31-13 and 32-66, which were published in 1945 and 1946 (See also Creat Enzime Condred Missile; Nockers and V-2).

Commitdynomet. A subbestike elastic explosive mass obtained on dissolving collection cotton in NG. This is called also Sprenggelatine (Blasting gelatin).

Gun (Genchütz) See Kanons and also Wespons.

Guncorton-Dynamit. See Trauxl Dynamit

H. One of the abbreviatious for Hexogen or Rezo (Cyclonute).

H<sub>g</sub>, H<sub>10</sub> sic. Hexogen phiegmatized with 5%, 10% etc. Montan wax,

H-1, H-2, H-5, H-8 Explosives, German Ammourtes,

described under Erentusprengstoffe.

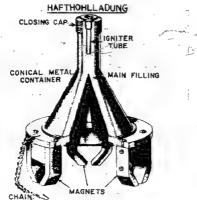
HA. One of the abbreviations for mixture of RDX (Hexogen) and Al (aluminum).

Hefthehilodorg (Adhering or Sticking Hollow Charge). One of the devices consisted of a control metallic container (filled with 3 lb 5 or of a till 10 when was strached an clongated apex, serving as a hand gop and contg the exploder peller (PETN/Wax) and a pull (inction) delay igniter (4) or 7 seconds). Attached to the base of the conical section was a plywood financework carrying three powerful, horse shoe magnets, a biase chain with a hook was "attached to the finance of the conical section was a plywood financework carrying three powerful, horse shoe magnets, a biase chain with a hook was "attached to the financework, Total weight 3 kg.

The device could be used either as a hand grenode to asia land mue. In the fixer case the cord of the triction ignifer year pulled olf and the greened throws argainst the approaching rehicle. In the second case, the device was buried in the ground, slose to the surface, with the magnets up and with the igniter cool, statched to the ground. At the approach of a vehicle the magnetic attraction caused the greenable nignition of the part and venture of the second of the second

Another magnetic antitank charge is described in Ref I, pp 20-25 under the nature of Penarenheadmins 3, it consisted of a bottle-shaped cardboard container, with 21/3 lb of hollow charge (TNT or RDX/TNT). Three pairs of magnets were mounted at the bottom of the bottle, and a 7/3 see friction spatter was located in the neck of the locde, 70-all weight of the device was 81.

The device was apparently designed to be placed by hand on the tank and the ignier pulled after it has been positioned. If the target was of non-magnetic material such as wood, the charge could be attached by means of a spikes located at the bottom of the device. (pp 262-3).



GRENADES HAND FRAGMENTATH STEEL CAS DETONATOR CLOPE FIRST

In another type of adhering (sticking) antitank hollow charge there were no magnets but a scicky pad (located at the wide part of the conical body) served for attaching the charge to a tank (Ref 1, p 324).

References: 1). Dept of the Army Tech Manual TM 9-1985-2 (1953). PP 302-3 # 323-4 2) H.H. Bullock, Picarinay Assenal; private communication.

Motimine (Adhering Mine). An amitank, hollow/charge device consisting of a conical container (filled with HE) provided with a flat up and a handle. The wide portion of the cone was covered with a layer of a low nelting colophony-oil planuc resis (mp ca 50°) retained on the surface by means of an open mesh cloth. In back of the flat top, which consisted of sheet metal, was placed a thermitetype charge (Mg + Al + KClO,) and in back of the latter a time fuse. The operator hid in a hole and, at the approach of the tank, ignited the fuse which, in turn, ignited the thermite. Just as soon as the heat of the thermite melted the lesin, the device was stuck (by the operator) to the bostom atmor place of the tank. At the same time the heat of the thermite set off the demonstor and this in turn initiated the main charge.

This device was in an experimental stage when the Reference: E.E.Richardson et al, CIOS Rept 25-18 (1945), OP 23-5-

Haleklauft, Same, au Petroklastit.

Raitberkeit oder Lagerbestöndigkeit (Stability in Storage) See in the general section.

Handfouerwoffen (Small Arme)-See under Venpons. Hondhobung saicheresprengstoffe (Explosives Safe to Nan-II- and to Transport). See Davis (1943), p 347).

Hamstoff (Urea). See general nection.

HC Mixture. A smoke mixture consisting of hexachloroethane and powdered zinc.

Reference: Anon, Field Actillery Journal B, 352-3 (1943). Henry A/T Mine. See under Landminen and size on pp 265-7 of TM 9-1985-2 (1953).

Hobolunder (Lever Type or Schuko Igniter). See Pressure laniter winder Igniter.

Hocht Gulded Missile, See Pike (Hecht) Missile.

Hellhoff Explosivet According to Ger P 12,122 of 1880, it was prepared by the nicration of purified tur oil, followed by washing, drying and mixing of the nitrotar with oxygen carriers, such as K (or Na) nitrate (or chlorate), etc. It was claimed that this explosive mixture was very powerful. Reference: See under Hellhoffie.

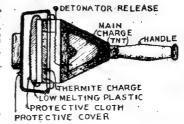
Hellhoffit (Hellhottite). One of the Sprengel type explosives, invented about 1870 by Hellhoff and Ordnon. It consisted of 28 parts of nitrobenzene and 72 parts of fuming nitric soid. This liquid was sometimes used absorbed on kieselgubr (see Gubrheilhoffic). The disandvantage of these Spreagel type explosives was their extreme corrosiveness (Ref 1).

According to Thorpe (Ref 2), Hellhoffir was tried in shells, the two lagredients being mixed during flight exploded on impact (see also Anilithe under French explosives).

Stettbacher (Refs 3 and 4) investigated Hellhoffit and its modifications and found that the glass-lined depth charges (Tiefenbomben) containing Hellhoffit, were much more effective than those loaded with piccic soid. The mixture consisting of funing nitric acid (d 1.52) 64.51, nitrobenzene 25.81 carbon disulfide 6.45 and aluminum bronze 3.23% was found to be one of the most effective. A mixture prepd by dissolving 66.7 parts of dinitrobenzene in 100 parts of fuming direic acid was also claimed to be effective. References:

1) Davis (1943), p 354 2) Thorpe's Dictionary, v 4 (1940), p 545 3) A.Stettbacher, S S 38, 158 (1943) 4) A.Stettbucher, Spreng- ue. Schiesntoffe, Zürich (1948), p 71,

## HAFTMINE



Hongstit. Smokeless propella was based on nitrated pulped ; with nome chemicals as des tionnaire (1907), p 313.

Menschell or He. A guided to during W& II.

Heraklin of Djekerhoff, An expl sawdust in a concentrate or agu parts of pierie seid and Am product was dried and mixed of pulverized sulfur and K. or ! Reference: L.Gody, Traite des Namur (1907), p 551.

Hetzer (Batter). A Czech design Destroyer, Jagdpan zer 38 (t) (See

Househrocks (Grasshopper). A (Waffentrager) auch as for 105 n Germans early in the WW II. The of the Illustrated Record of Gern 1945, War Office, London ( 1947). Note: The above British book fear that they are "confidential" swith British sources.

Hexa, Hexamin, Hexanitradip (Hexanitrodiphenylamine) (HN general section under Diphen information concerning the c Hexa in Germany during WW II At Allendorf Fabrik of

of manufacture was as follows: To a charge of 1000 kg o in a V2A stainless strel capacity (fitted with an agi a cooling jacket and co diphenylamine was adde temperature was maintain was diluted with weak at 30-40°. The precipitated off, washed thoroughly screened and packed.

HNDPhA was used by th of B& I in an underwater explo 40 and TNT 80%. During WV replaced by the one contain 55.7 and Al 16.4%. Anothe contained HNDPhA 23.0, Ti Stettbacher (Ref 5) cites a mi PhA with 30-40% TNT and 16 Schienswolle 18, TSNV-1-101 References:

1) A.Stettbacher, Proter (Swit 21 US Naval Tech Mission 513-45. Hexanimodiphenylan many , PB Rept 38, 154 (1945 3) O.W.Stickland et al, PB Re 4) Apon, Ailled and Enem Proving Ground, Md (1946) 5) A.Stettbacher, Spreng-(1948), pp 78-29.

Hone 5-22, 5-26 and E-4.Ger containing hexanitrodiphenyl Erstatzaprengstoffe.

HC Mixture. A smoke mixture consisting of hexachloroethans and powdered zinc. Reference: Ason, Field Artillery Journal B, 352-3 (1943).

Henry A/T Mine. See under Landminen and also on pp 265-7 of TM 9-1985-2 (1953).

Hobolzunder (Lever Type or Schuko Igniter). See Presaure Igniter under Igniter.

Hocht Guided Minnile. See Pike (Hecht) Minnile.

Hellheff Emplestives According to Ger P 12, 122 of 1880, it was prepared by the hittation of purified tar oil, followed by washing, drying and mixing of the nitpotar with oxygen carriers, such as K (or Na) nitrate (or chlorate), etc. It was glaimed that this explosive mixture was very poweful.

Ruferenen: See under Hellhoffit,

Helheffit (Helhoftice). One of the "scenage type acroplaniers, invented about 1870 by Helhoft and Granges, It consisted of '28 parts of ultrobensess and 72 parts of tuning airts edid. This liquid was sometimes used absorbed on kieselgubt (see Gubrielhoffit). The disadvantage of these Sprengel type explosives was their externe corrosiveness (Ref 1).

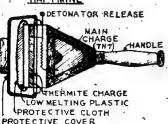
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Davis (1943), p 354
 Thorpe's Dictionary, v 4 (1940), p 545
 A.Stertbacher, Spreng- np. Schlesstoffe, Zürich (1948), p 71.

## HAFTMINE



Hongstit. Smokeless propellant, patented in 1888; was based on nitrated pulped straw previously treated with nome chemicals as described in Daniel, Dictionanire (1902), p 373.

Monnchell or Ms. A guided missile (q v ) developed during W II.

Hessilis of Dickeshaff. An explosive prepd by soaking nawdant to a concentrate or aqueous solution of equal parts of pictic acrd and Am nitrate. The resulting product was died and mixed with visitous amounts of nulverized suffer and K, or Na histories.

Reference: L.Gody, Traité des Matières Explosives, Namer (1907), p 531.

Hetser (Baiter). A Czech designed and constructed Tank Destroyer, Jagdpan zer 38 (t) (See under Panzer).

Househvecke (Grashopper). A peries of weapon carriers of mean and the Gamman senty in the WW II. They are described in wel III of the Illustrated Record of German Auny Equipment 1939-1945, Was Oflice, London (1947).

Note: The above British books were not consulted for fear that they are "confidential" or "secret" as is usual swith British sources.

Hexa, Menamin, Mementrodiphenylamin, oder Menyl (Memoisrodiphenylamine) (HNDPhA). Described in the general section under Diphenylamine. The following information concerning the manufacture and use of Hexa in Germany during WW II is available:

At Allesdorf Fabrik of WASA-G. the method of manufacture was as follows:

To a charge of 1000 kg of 99% nitres acid pfaced is a V2A acialism used nisrator of 2 cubfe meet capacity (fitted with aff agitator totating at 60 RPMs a cooling inches and cooling forth) 300 kg of diphenylamine was added gradually while the temperature was maintained at 90. The solution was diluted with weak aftic acid and cooled to 30-40. The precipitated MDDPAs was filtered off, washed theroughly with water, then dried, \$5 acreemed and packed.

MMDPA was said by the Germans at the start of WP in an undertware capicalise containing MNDPA 40 and TNT 50%. During WW II, this explosive was replaced by the one containing MNDPA 27-9, TNT 53-7 and A1 16.4%. Another underwarer explosive container MNDPA 23-0, TNT 61.8 and A1 15.2%. Seathbocker (Ref 9) circa a mixture constitute of MNDPA 28-0, TNT 61.8 and A1 15.2%. Seathbocker (Ref 9) circa a mixture constitute of HNDPA with 30-40% TNT and 16% A1 (See alog Mennatics. Schicanwolle 18. TSNV-1-101 and Erwatzspirongsvorfe). References:

A.Stettbacher, Protar (Switzerland) #, 33-45 (1943)
 is 5 Nevel Tech Mission in Europe, Tech Rept 513-45. Hexanino-liphenylamine Manufacture in Germany, PB Rept 38, 154 (1945)

3) O.W.Stickland et al, PB Rept 1820 (1943), pp 13-17
4) Ason, Allied and Encay Explosives, Aberdeen
Proving Ground, Md (1946)

5) A.Stertbucher, Spreag- and Schiesstoffe, Zurick (1948), pp 78-29.

Mexa 5-22, 5-26 and E-4-German substitute explosives containing hexanitrodphenylamine described under Reseatsépengatoife.

Hexadi — German name for Maxamethylanetetromine Dinitrote,  $C_8H_{12}N_4 = 2H_2O$ . (See E.A.-Verfahren under Hexagen).

Manal. An explosive mixture consisting of 75% Hexogen (desensitized with 5% of max) and 25% Al powder; was used in underwater ammunition. [PB Rept 1820.p 40].

Hexamethylentelemin (Hexamethylenetetramine) (HMcTeA), called also Hexamin, Metheneamine, Aminoform or Urotropine, See general sec. 102.

Musum eringim erstementen Dirivettives (Explesives). To this group belong freplesives containing Hempes (BDA) or Cyclemized and Redail (Cyclemized hydrocinitive entire the second of the containing the second of the containing the cyclemized and investigated two explication (ref. gliphate Ninemizes of WE II) obtained as by-preduces in the manufacture of Hempes by the E-Salz and KA-Salz processes.

Both of these substances were claimed to have the containing the contai

powerful explosives than Hexbgen. Reference: G.Römer, PBL Rept 85,160 (1946), p 16.

Hausmanhylenetriporaxidodiomine (HMTPDA) (Hexamethyleotriperoxyddiamia). Preputation and properties are given in the general section. The supplosive use proposed in in the general section. The supplosive control of the instance, the No 8 corper cap might contain 3.1 g of HMTPDA and 1 g of TNT. Reference: C. von Ginewald, Ger Pat 274,522 (applied for in 1912; tuend-the 1914).

Mexamin Ous of the German designations for Hexaattrodiphenylamine. The same designation was ward for Mexamethylenetetramine.

Mexemit, or Mexemit. As, explosive used during WW I for cast loading torpedors, sea mines, and depth charges. It consisted of hexanitediphesylamine (HMDPAA) 60-70 and TNT 40-10%. Its properties are described in the general action.

After remination of WI, the Heramit was used as a component of a commercial explosive known as "Neurodit".

The term Heransic was also used for the following confuserial capitairs: profit from supulse, nanosited of WW 1: 60 to 90, fatts of HMDPLA, in which might be present up-76 40% plorits acid, 10 to 40% DNT, TMT, and/of TNN, and 0 to 4% vegerable small. Reference: J.Papin Luballeur, Poudtre, etc., Paris (1873), pp 47-9.

Note: According to TM 9-1985-2 (1953), p 15, the Hexamit was used in the warhead of Kirs Apparetus (q v ).

Hexenit. Same as Hexamit.

Mexentredicthylnitramine. See general section under Diethylnitramine.

Houseltrodiphonylomino. Same as Hexa.

Here. One of the abbreviations for Hexogen (H) (Cyclo-

Hone (S-19 and S-22). German substitute explosive containing Henogen (RDX); described under "Ersatz-sprengstoffe".

Hanngon er MADX/also called V-Sala, E-Sala, A-Sala, SH-Sala and KA-Sala, depending on the method of manufacture. It is deskibled in the general section as Cyclonite (Cyclotemethylean Trinitramine).

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ow thinge with HE), portion of ling colone autate us, ilst top, a thermite-the latter a the sproach ignited the

size melted sor) to the se the hear manifiated when the i-18 (1945).

, 4 ibility in

pons. yes Safe ), p 347).

(Henning, Ger Pat 104 280, 1899 ), it was not used as an expionive until about 1935 when its manufacture was started aging the W-Verfalten described below. Four other methods of manufacture were later introduced and production reached its peak with 7,700,000 lb produced during the month of June 1943. Out of the five methods developed in Germany and described briefly below, the so-called Ka-Verfahren proved to be the best because it was the most economical. required less space and equipment and used readily available

raw materials. Following are the German WW II methods of manufacture. aremged is approximate chronological order:

W-Verichron (V-Process), developed in 1935 by Dr Volfram of the IG Farbenindustrie, wan based on the reactions indicated by the following equations, starting from sulfur

a) 350, + 5NH, -> H\_N-SO\_ONH, + HN (SO\_ONH\_); The resulting mixture of Am amisomifonate and Am iminomifonate was treated with a sole of Ca hydroxide, which gave a soluble Ca amiso-sulfonate and a ppr of Ca

b) H\_N-SO\_ONH + HN(SO\_ONH ) + 2Ca(OH) --(H\_N-SO\_O) C. + C.SO . INH OH.

The liberated manonin was recovered and used in reaction (a). The Ca sulfate was removed by filtratide and the Ca aminosulfocate treated with K sulfate. c) (H\_N-SO, O), Ca + K\_SO, - 2H, N-SO, OK + CaSO,

The resulting K national losate was separated by filtration and treated with formal dehyde at 30° at a pH of 3.

d) 'H<sub>2</sub>N·SO<sub>2</sub>'OK + HCHO -> H<sub>2</sub>C:N·SO<sub>2</sub>'OK + H<sub>2</sub>O.

The resulting condensation product, K methylene mainopulson ste, called Weiss-Selz (White salt), was nitrated with mixed at the sultrine acid at 50° in a stateless steel attends of 50° in capacity.

with CIN-SO OK + SHNO - (H C N-NO) + SKHSO

This procedure (which under certain conditions gave yields up to 30% based on the formuletyde used) was fullowed at the Krummel Fabrik of Dynamit A.G until as explosion in 1943 completely destroyed the plant. Othog German plants did not use the V-terlahren because the thought methods such as the Shikh and K-proved to be more

Nous A similar method was patented later by R.W.Schlensler

and J.H.Rosa, U.S. Per 2,434,330 (1948).

2.E-Vorbahon (E-Process), developed between 1935 and
1938 by Drs Eberle and Fincher, was based on the reaction of paratomaldehyde with Am nitrace, dissolved in acetic anhydride, which acted as a debydrating agent: (HCHO)3 + 3NH4NO3 + 6(CH3CO)2O - (H2C-N-NO2)3 +

12CH COOH

The remilsing Cyclonite was separated by means of a autsch, from the scetic acid produced by the reaction, washed with water, stabilized and daied. The finished crystalline product had a mp of only 190-195, and the yields varied between 60 and 75%, calculated on paraformal deby de.

The E-Verlahren was used at the Bobingen Fabrik. Dynamit A G and produced 125 metric tons per month. It was captured is 1944 by the KA-Verlatren which enabled the production to be doubled with the same equipment. Note: The Cyclosiste obtained by this method contained the same impunities as described under KA-Verfahren but in larger amounts.

SM-Verfehren (SH-Process), developed in 1937-1938 by Dr Schnurr was based on the original method of denning (1899), which involved direct nitration of hexamethylenetetramine (called also bexamine or urutropine) with nearly absolute nitric acid, according to the following equation: Cattan + 6HNO - (HaC-N-NO) + 6HaO+3CO2+2N2

A nimitar method, was independently developed by Dr G.C. Hale at Picatingy Arsegal.

The improvement introduced by Dr Scheuts consisted in carefully controlled heating ("cooking-olf") of the contenus of the nitrator directly after the completion of the reaction.

Under these conditions the unstable products formed during the reaction were partly decomposed and partly nitrate-

The nitration in the Sit-process was conducted at "" are namence in the Anterocast was conducted at the phite 90% interesting the purised Cyclosis had any phereoge 200° and 202° C.

While left the original (Kamana's) method the yield was very low (about 40% based on C.H., N. dued), the improved method was much more econobical yields up to 71.5%

were reconsted

were reported:
The Sit-process was used in at least unree plants
of them belonging to the Dynamic A C . Christian mane
for them belonging to the Dynamic A C . Christian mane
for the state of the state of the state of the state of the state
for constant up, to 500 to/mo) and Unknowning (producing
up to 250 to/mo). The Sit-process was considered by be
more economical than the "My E - or E processes; but falenor to the KA- process.

Talestor to the RA process.

A K-Verbehom (K-Process), feveloped by Dr Kapfiller of WASA-G, somewhat large their the E-Verlahren, was based on the following edge-discussions: Yak the theramentyl generated by the process of the Company of the Comp CHINA + 4HNOs / 2NH HO3 - 2(H CNNOs) + 6H 20
Nitric acid of 99% suremath was used and was required

in larger quantity than for the other methods. This made the recovery of apont acid a very difficult and expensive problem. Only one German plant used this method (Elania Fabrik of W A S A G), producing 200 metric tons per month.

5. KA-Verdaheah (KA-Process), developed by Dr Kaöffler of W A S A G was actually a combination of parts of the K- and E-Processes, it consisted in teleming the hexamethyleneretramine dinitrate with acid Am nurate in acetic a) CaH12Na + 2HNO - CaH12Na 2HNO (Hexamethylane-

terramine dinitrate). ,b) C H 2N 2HNO + 2NH NO HNO + 6(CH CO) 0-6

2(H,C.N.NO.) 4+ 12CH COOH

la/this method, considered to be one of the most eco-nomical, paraformaldehyde was not used, because all the necessary CH,- groups were supplied by hexamethylene-seriesine. A similar procedure was developed in the U.S.A. by W. E. Buchmann (See general section under Cyclonite). In the K process, as practiced at the Bobingen Fabrik, amine was keeted with weak nitric acid (35-30%) at a loud 5" and the resulting dinitrate (called in Germany Hoxedi). was dried. "The dry product was dissolved in aceric anwas aned. The cry product was dissolved in acette anyddide\_mang, at standless used vessel 'equipped with a padde-type attract) and then acid Am nitrate (previously peepl by treating Am nitrate with'll not of 100% nitric acid) was added. The resulting solid product was separated from acetic soid, then washed with water and dried. The cyclonite obtained by this method was called KA-Selz. It contained, as impusites, to 2% of HMX (cyclotetramethylenetetra-nitramine, called in Germany Octogon). (H.C.A.NO.), and a small amount of cyclotrimethylene dinitromonoacety online, (CH,) N (NO,) OCH, Higher percentages of these impusities we produced when the E-Verfahren was used. Note: The advantage of the KA-process over the E-process and: He dovuming or the A-process over the E-process was that by using hermanic instead of pseudossidelydereward that the second of the Control of the Contr when the method was changed in 1944 from the line to the KA- process.

from which the next amount of the basis of formaldehyde (from which the next amount was produced), were 80-82% for the KAPpocess, as against 73-75% in the E-process, in the KA-process the production of 100 parts of Cyclosite required 40p of hexamine, 43p of Am nitrate, 68p of nitric acid and 240p of acetic anhydride (of which 195p were recovered as

A recent article of Mayer (Ref 5) described some German methods of preparation of RDX and likts its properties an follows: mp 201-3, d 1.82, explosion

temperature 230°, impact sensitivity vith 2 kg weight Straight Herogen was used by the Germans

as a booster, sub-booster and na a bursting charge in rifle-grenader and some amail caliber shells, it was also used with a small amount of wax, e.g., 3%, as a sub-boostet as the African campaign to replace PETN-wax mixtures. With a larger amount of was, e.g., 10.3%, it was used in 75 mm shells. Hexogen was also used with ather proportions of wax as well as with TNT. Al etc. [ See Fillers Nos 86, 89, 90, 91-45. 92-H10.3, 92-H3, 95-H/Ep O2, 105 (or Triales 105), 106 (or Trialen 106) and 109 (or Trialen 109), described under Fillers ].

Referencent " 7) PB Rept 925 (1945) 2) PB Rept 16,669 (1945) 3) Allied and Exemy Explosives, Aberdeen Proving Ground (1946) 4) A.Stettbacher, Spreng- und Schiengtoffe, Zurich (1948). pp 68-69 5) J. Mayer, Explosivatoffe, 1954, No 3/8, pp 83o 5 (Uber Hexogen, seine Febrikationsmethoden und Einenschaften).

Summit. One of the explosives invested by Stetthickus See mader Swine Explosives. .

Honoplost 75- A plastic explosive, developed during WW II at the Krimmel Pactory of Dynamit A -G It contained RDX 75, NC 1.2 to 1.4, liquid DNT 20.0 and TNT 3.8 to 3.6%. This mixture was prepd by heating the required amount of RDZ to 90° in a Verner-Pfleiderer, mixer, and blending is wish a small assount of NC. This was followed by the addition of a DNT-TNT mixture and further blending . B noing this order of addition, lumping was avoided.

The mixture was put out in cylinders about 220 mm long by 28 ster in dismeter. Due to difficulty with direct cap initiation, a booster was provided it consisted of compressed, phlegmatized PETN pellets about 40 mm long by 21 can diam and equipped with a decounter well 20 mm.

Nose! This explosive was developed as a substitute: for the plantic emplosive, which used RDX plus American vaseline, because the latter component was no longer available in Germany. This vaseline, balled "long fibrous" by Meyer had much greater adherence than vaselines manufactured in other countries.

Reference: O.W.Stickland, General Summary of Explosive Plants, PB Rept No 925 (1945) Appendig 7 (R. Heyer, Development Cork on Explosives at Krimmel).

Henryl . Same as Hexa.

High Process Pump. See Hochdrockpumpe

High Speed Townson for tenting various weapons are de-actibed in ClOS Rept 39-47 (1945) and in L.E.Simon, German neribed in ClOS Reprise (1747); Research in W. II, J. Riley, N. Y. (1947);

Research in W II. J. Alley, N Y (1974).

Mendifultybusped oder V-3 (High Pressure Pump, called also-Passy Linis' or 'labilipide') was ar constant-pensure gain developed dissing W II By 'Condern, as registered of, the film Réchiles, Santirichiers, and introded to first the Asiova (Headile) Proposeries (q v no. 2009) was of unalleyed crecking and the second of the control of the c

being und the bear As the projectile pe propellent Charges and after master of the projectile a charges between

every 5 minutes but because the section to insert new Y" Die References: 1) L.E.Simon, Gern N Y (1947), pp 191-2) W.Diffeberger, "V-3) A.I.Sprinz and

Hechangle styldena (HE). See genett

Gus, sharevinted to is has been known' prepared in a few projectile. This me projectile, that w

Germany since 1806 s not used as as ex-soufacture was started w. Four other methods and production waches during the month of developed in Germany the most economical used remiliyavailable :

echods of manufacture.

in 1935 by Dr Wolfram sed on the reactions s, starting from sulfer H + HN (50 ONH ). minoralfonate and Am; solu of Ca hydroxide, mate and a ppt of Ca NH .) + 2Ca(OH) .--

SO . T SNH OH covered and used in removed by filtration d with R sulfate, H<sub>2</sub>N·SO<sub>2</sub>OK + CASO<sub>4</sub> e was separated by le at 30° at a pit of 5. LC:N-50°OK + H<sub>2</sub>0. oduct, K methylene-gite sait), was aimased

in a prajaleau atoul C N-NO J . + SICHSO . retain conditions gave remaidshyde uned) was Dynamit A-G until destroyed the plant. a W-Verlishren become d K proved to be more

ever by R.W.Schiesales between 1935 and based on the reaction O - (N.C.N.NO.). +

parated by means of chiced by the reaction, I direct. The linished only 190-1950 and the calculated on pages

the Bobinges Fabrik, servic tous per mapth. erfahren which enabled the same equipment. d under KA-Verfahren

unstropine) with nearly he fortowing equation : deatly developed by

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The Shiprocess was used in at least three misnes The Sti-process was used to at least three plants all of these belonging to the Dynamit, A. G.: Christianistated (producing up- to 3000 netwic tones, per mosth). District (producing up- to 3000 netwic tones, per mosth). District (producing up- to 250 to/ps). The Sti-process was considered up-benger consociated that the "Er/ E-- or K. processes, but

more economical than the 'W', E-ro IK- processes, but Infection to the Kap Puccasa. Investigate the KAP puccasa. A K-Verbahren (K-Puccasa), developed by 'De Kapfiller of 'A S.A.G., somewhat land there has E-Verlahren, was branch on the following chemiderations: An the hexamethylumetrimaine contains GCAV groups and only Milty groups, there is a deficiency of two NM, groups, which are the second of the contains the second of the contains the second of the contains the contains the second of the contains and the second of two modes of Am situation and the second of the contains and the second of the second of the contains and the second of the contains and the second of the contains and the second of the se in larger quantity than for the other methods. This made

in larger quantity /than for the other methods. Its made Age receivery of spans not of a very difficult and expensive production of the spans of see as and by processes, it consisted in Uniting the heat-methyleneterrimine districts with acid, Am street is access-subydride, we can be need from the following equations: a) CaH 2N a + 2HNO 5 = CaH 12N a 2HNO 3 (Hexamethylene-

fertamine distrace),
b) C<sub>B</sub>H<sub>12</sub>N<sub>4</sub> '2HNO<sub>2</sub> + 2NH<sub>4</sub>NO<sub>3</sub>'HNO<sub>3</sub> + 6(CH<sub>3</sub>CO)<sub>2</sub>O ->
XH<sub>2</sub>CN·NO<sub>2</sub>)<sub>2</sub>4e 3ZCH<sub>3</sub> 'COOH

In this method, considered to be one of the most economical, parlitormanderlyde was not used, because all the microsarp. Ch., group a user supplied by hexamethicaes—considered by the Establishment. A afmiliar procedure was developed in the U.S.A. by W.E. Batchmann (See general saction under Cyclogide). In the U.S.A. practiced at the Bobingen Sabtis, beaming was it Remed with weak nitric and (35-50%) in those 5" and the resulting dinitrate (unlied in Germany Howedi), 5° and the resulting dinitrate (called in Germany Hewedl), was died. Then day product was dissolved in acceive men, byddidagagaing, a, stanless, seed versel equipped with a posid crypt entirely and then acid Am intrate (previously product the stanless), and the seed of the stanless seed the seed of the stanless seed of the (CH2) N (NO2) OCH . Higher percentages of these im-(Chi\_jh\_M\_QO\_j-CCH\_\_higher percensages or these mappings of the produced what the E-Verfahmer was used. Note: The wavantage of the KAPPOCESS over the E-process was that of the manual of water was produced, thus requiring a success smaller amount of vester such washes that of the amount of vester such washes amount of the state of amount of production of the Bobinges of Abril, Dynamia A-Cc. for any Production of the Bobinges the method was changed in 1744 from the Bog of the

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Yields, when relculated on the beaus of formuldehyde (from which the hexamine was produced), were 80-82% for the KA-process, as against 73-75% in the E-process, in the KA-process the production of 100 pasts of Cyclosite required 40p of bezamine, 43p of Am nitrate, 68p of nitrie soid and 240p of acetic anhydride (of which 193p were recovered as

A recent article of Mayer (Ref 5) described some German methods of preparation of RDX and lints its properties as follows: mp 201-3, d 1.82, explosion

temperature 230°, impact sensitivity with 2 kg weight 40-45°cm, velocity of deconation \$400 m/sec Straight Hesogen was used by the Germans

as a booster, anti-hooster and as a buricing charge in rifle-grendes and some small culiber shells, it was also used with a small amount of wax, e's . 1%, as a sub-booster is the African campaign to replace PETN-was mixtures. With a larger amount of was, e.g., 10.3%, it was used in 75 stm shells. Hexogen vam, e g., 14-27e, 11 was uneed in 72 mm mettle, henogen vam alon need with picher proportions of war as well as wiel/ TNT, Al etc. [See Fillers Men 86, 87, 90, 91-415, 92-HU3, 92-HU5, 92-HUF, 92; ]05 (or Trialen 105), 106 (or Trialen 106) and 109 (or Trialen 107), described under Fillers 1.

References: " 7) PB Rept 925 (1945) 2) PB Rept 16,669 (1945) 3) Allied and Enemy Explosives, Aberdeen Proving Ground (1946) 4) A.Seetthaches, Speange and Schienceoife, Zurick (1948). ph (68-69 5) J. Mayer, Explosivatolie, 1954, No 3/8, pp 83o 5 (Uber Herogen, puind Fahrikationamathoden und Einenschäften).

bearing. One of the employings invested by Stettbacker-See under Swins Explosives.

Houselest 75. A plastic explosive, developed during WW II or the Erimmel Factory of Dynamit A -G Is contained RDX 75; NC 1.2 to 1.4, liquid DNT 20.0 and TNT 3.8 to 3.6%. This mixture was propd by beening the required amount of RDK to 90, in a Verner-Pfleidezer, mixer, and blending it with a small assessed of NC. This was followed by the addition of a DNT-TNT mixture and further blending . By using this order of addition, lumping was avoided.

The mixture was put out in cylinders about 220 ma long by 28 nm in diameter. Due to difficulty with direct cas initiation, a booster was provided it consisted of compressed, phiegenesised PETN pellets about 40 mm long by 21 am diam and equipped with a decounter well 20 mm

Meen: This explosive was developed as a substitute for the plantic explosive, which used RDX plus American was aline, because the lesser component was no longer available in Germany, This vaseline balled "long filorest" by Mayer, had such greater adirevence than vaselines manufactured in other countries.

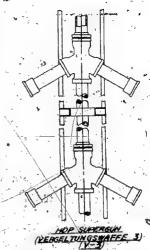
Reference: O.W.Stickland, General Summary of Explosive Please, PB Rept No 925 (1945) Appendix 7 (R.Mayer, Development d'ork on Explouves et Krussel).

Herryl. . Some on House.

Made Program Pome. See Hechdrockpumpe

Mich Speed Training for touting various weapons are de-perihed in CIOS Revi.29-47(1943) and in L.E.Simon, German Rouserch in WK E. 4. Siley, N. Y. (1947).

Mondatubemph one W-2 (High Pressure Pump, called also-Busy Linia or Baltireds') unay a constancymant gar dim Roefiling, Santrickina, and introduct to the the Asiav (Razalle) Prescribe (q v) across the Channel at London The heart, callet 15 mm (5.9°), was of mathiyed creeking not memor, cannet 120 mm (5.37), was of untilitied cracibins cant study under up of a great name; "Pubped sections; each 12 m 16 to less. Vide the gas where 450 ft long contents to the content of the c



The just could life on the pround without any certains on wooden and concerns blocks aloped as a 45 magle. The linewaltimed, arrow properties to the linewaltimed, arrow properties to the linewaltimed, and the linewaltimed line to insert new Y- piecess

neutroness: 1) E.E.Simon, Grand Research in World War II, J. Wilgy, NY (1547), pp 191-3

2) W.DMb.pherer, "V-2" Viking, NY (1974), p 247

3) Al.Spring and H.R.Ballock of Picaninay Assembly privany-Comment cation.

Hanhamlantvhileper ader Blirastoffe (High Explosives) (HE). See seneral section.

Mach and Mindordronkkenson (High and Low Pressure Gun, abservinted to H/L Gun) (Canon à payère, in French). Ir has been known for a long time that the lower the peak pressure in a gun the thinner may be the walls of the projectile. This means that for a given total weight of a assisctile, that used is a gam with lower peak pressure can contain more explosive and de more demans to a target.

Better results were obtained in 1943 when Dr Hermann and collaborators of the Rheinmetall-Borsig A -G constructed the 8 cm PWK (3 (80 mm Antitank Gun). The description of this gun called in French "canon antichar models 1943", wan given by Travers and Touchard (Ref 3). They tilsim that the "curbocanon Delamare-Maze" invented in Frence about 20 years earlier may be considered as the predeceasor of both the fi/L and recoilless guns.

The German aun 8 cm PWK 43 had a comparatively thin barrel with an inside diameter of 81 mm and was 34 ralibers long; the chamber had an enlarged diameter (105 mm) and much thicker walls. The projectile (fincail type, 81 mm in diameter, contained a shaped charge and weighed 3kg) way inserted front in the bord that in acquarate-loading ammunition). This was followed by the carridge (120 mm long and 105 mm in diameter) which contained the propellant. The carridge was closed by mesos of a disc provided with eight perforations (each 13 mm in diameter), When the propellant burned the pressure of the gases developed inside the entiridge was about 850 kg/cm but the pressure acting on the projectale was only 350 kg/cm2 because the gazes lost part of their velocity on passing through the -holes in the disc.

The relation between the high pressure inside the carridge case and the lower breasure in the bore could be varied by increasing or decreasing the size or number of the openings in the separating dist? In order to protect the propellant in the container from spilling and from moisture, the perforated metallic disc was covered with a solid disc of paraffined cardboard,

The halfistics for the H/L gun were worked out by Travers and Touchard in France and by Corner in England. Note: Corner states that towards the end of WW II the Germans started to manufacture two light antitank guns: the 8 cm PAW 600 and the 10.5 cm PAW 1000, but does not describe them. He also mentions the 8.8 cm W71 gun, which was built on the "three-pressure principle" ... References:

1) 1. Comer. | Franklin last 246, 233 (1948) 2) 1. Comer. Theory of the Internal Ballistics of Guna, J. Wiley, N.Y. .(1950), pp 312-327 3) S. Traners & L. Touchard, Mem Artil Fr 26, 835-58 (1952) 4) Ibid, 22, 219-36 & 245-78 (1953).

Hohiladung (Shaped or Hollow Charge). Considerable work was done in Germany before and during WW. II on the development of shaped charges. Among the most prominent contributors in this field were the personnel of Krummel Fabrik, J D A -G Among the shaped charge weapons developed at Krimmel may be mentioned:

- a) Magnetic anti-tank shaped charge weighing 3 kg; blast penetration of street was up to 250 mm
- b) Shaped, charge: for Faustpatrone, Panzerlaust, Pagzenchreck.etc.
- Note: At Krummel it was yound that the best explosives for

shaped charges were RDX-TNB and next RDX-TNT mixtures. Substituti DEIN for RDX lead to a decrease in efficiency.

The addition of glumiaum powder was devirable but not ... in farze maeriry.

Krimmel was not the only place where work on shaped charges was conducted. Elsewhere the Germans developed a shaped charge shell which was shot from an 80 mm morter called "Panzerwurfkanone", and the wathrade for agreeal suided missiles.

Historical, Discovery of the hollow (shaped) charge (HoC) effect is usually attributed to C.E.Munroe (USA who described the effect in the Amer L Sci 36, 1888. It was claimed by H.Schardin that Max von Forster of Gennary had in 1883 already shown that bare hollow charges gave an enhanced effect along the axis of the charge. The first practical application of the liou effect. change. In a farst practical application of the 100c struct-ico denolition charges, sea mines, to propodes, projectiles erc., was patented in 1910 by E.Neumann. & the West-Ringer-Anhaltische Sweet [1914]. A 1915 Control of the Research of the 1915 Control of the 1915 Control of the Research of the 1915 Control of the 1915 of the HoC effect was done, prior and during WWII, H.Schardin et al in Berlin, Some work was also carried out by A. Stettbacher of Switzerland during this period, Note: According to A.J. Dete, Ordnance Sergeant, October 1945, pp 3-13, hollow (shaped) tharge smmunition twas and by the Germans in many 75, mm callber weasons.
There were at least lour types of such projectiest HiHI/A, HI/B and HI/C. Most of these projecties are listed in this dictionary under Granace and are briefly described in TM 9-1985-3 (1953). Some projectiles of calibers 88 mm, 100 mm; 105 mm and 150 mm also had shaped charges. The coclosed drawings represent some typical German

hollow charges, (See next page). References:

1) A.Stettbacher, Nitrocellulose 8, 83-84 (1937)

2) O.W.Stickland et al. PB Rept 925, Appendix 3. p and Appendix 7 3) L.E.Simon, German Research in WVII. Viley, N Y

(1947); pp 118-120, 188 4) A.Stettbecher, Spreng- and Schlesstoffe, Raucher, Zürich

(1948), pp 133-34 5) H.L.Porter et al. CIOS Report 33-27 (1945). This report is classified and information contained therein

has not been used for this dictionary. (See also Shaped Charge in the General Section)

Hoka" (Hochkonzentriert = Highly-concentrated) Procous for the manufacture of 98-99 % nitric acid, developed during WW II was used in several German plants. In this process. the concentration of the weak acid (50%) was effected by mixing it with liquid aitrogen tetroxide (N.O.), and adding the necessary extra oxygen under 50 atm pressure in an

Description, of this method as preciced by the IG Fathenind A & subsidiary, the birtschaftliche Forschungs-gesellschaft, mbH (#1FO), Embsen, Kr Lüneburg is given in the following BIOS Final Reports: 1232 (1947), pp 15-16 and 1442 (1947), pp 84-98.

Hollow Charge. See Hohlladung.

SAWDUST AND EXPLOSIVE FUZE POCKET

MATOR

e of shaped charges not depend upon the amount of the low pressure in-a e. enould, pe made case larger. Such sustable because the e burned tregularly r). Also, the initial ound to cound which

chieved. 3' when Dr Hermann -Bersig A -G con-Anticank Gun). The ch "canon antichat Touchard (Ref 3).

nare-Maze" invented e considered as the TE AUGE.

comparatively thin and was 34 ralibers meter (105 mm) and tional type, 81 mm e and weighed 3kg) on antheolesiateder reridge (120 mm long ined the propellant. of a disc provided in diameter). Then the gases developed m" but the pressure kg/cm'2 because the passing through the

ed sten, saveste in the bore could the size or number In order to prosect spilling and from was covered with a

were worked out by orner in England end of WW II the light southers guns; PAW 1000, but does he 8,8 cm \$71 gun. maciale".

(1948) 2) ].Comer, Guns, J. Stlev, NY ty Touchard, Mem 27. 217-36 & 245-78

Considerable work WW II on the develmost prominent con-I of Krummel Fabrik, eapons developed as

arge weighing 3 kg. 250 mm atrone, Panzerfaust.

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The enclosed drawings represent some typical German hollow charges. (See next page).

References:

1) A.Stettbacher, Nitrocellulose 8, 83-84 (1937)

2) O.W.Stickland et al. PB Rept 925, Appendix 3, p 46 and Appendix ? 3) L.E.Simon, German Research in WWII, Wileys NY

(1947), pp 119-120, 188

4) A.Stettbacher, Spreng- und Schiesstoffe, Rascher, Zurich

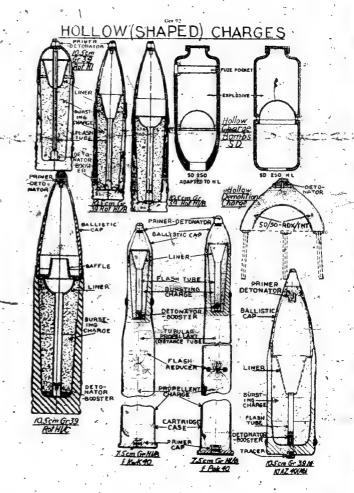
5) H.L.Porter et al. CJCS Report 33-27 (1945). This report is classified and information contained therein has not been used for this dictionary.

(See also Shaped Charge in the General Section)

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Description of this method as practiced by the IG fathenind A G subsid aty, the wirtschaftliche Forachunge-genellschaft, mbH (WIFO), Embsen, Kr Lüneborg in given in the following blOS Final Reports: 1232 (1947), pp 15-16 and 1442 (1947), pp 84-98. Hollow Charge. See Hohiladung.

Hollow Charge Nose Attachment for AP Bombe, to order to 50 250-SAWDUST AND CEMENT ment for FUZE POCKET -



S ST

ang, Heil

P S

permit 'greater penetrating power from low altitudes some German 250 kg AP bombs had a hollow charge (weighing about 4 kg) attached to the none. This charge was detone ted by it's own nose fuse as soon as it hit the atmos. The explosion of the HoC produced a hole in the armor (as deep as 7 cm) which permitted the AP bomb to enter inside the target. The AP bomb being provided with a short delay fure and not explode until it was inside the target. In order to protect the bomb from premuture detonation the space between the HoC and the none of the bomb was filled with sawdust and coment. Reference: TM 9-1985-2 (1953), p 5.

Helzowist (Wood Spirits) See Mathanol in general section.

Halamehl (Wood Meal) See Wood Flour in the general acction.

Halzmine 42 See under Landgunes and also on p 263 of TH 9-1985-2-(1953).

Holzpoch (Wood Pitch) See general section.

Heizstelfmesse (Wood Pulp). See general section.

Heinteer (Vood Tec), See general section under Tet.

Helazallater (Wood Collulose or Chemical Wood Pulp), See general section.

Haming Guidance Systems for Missilve, such as Acoustic, Rader and Infanted new briefly described under Guidance Systems for Missiles.

Hamitney (Haubitneh., See w. Sep Verboon.,

Ha 117 (Henschel 117), also known as Schwetterling (Butter-fly), was a rocket propelled, radio controlled, missile for tays, was a sorter properties, some versions were for area against homber (ornations, Some versions were for ground-to-sit and mome for air-to-sit, le med liquid fuel called Tonks and so oxygen carrier called Salber. TM 9-196-20 [373], pp 196-201].

Fis 293 (Heaschel 293) was a radio-controlled missile re 23 (Hessche: 293) was a ranto-controlled master released and directed to the target from an aircraft. The model fully developed and used was the Hs 293 A-1. Other models such as Hs 293 A-2; Hs 293 B, Hs 293 C, Hs 293 D, ac were not fully developed. TM 9-1985-2 (1953), pp 201-3.

He 298 (Henschel 298) was a rocket-propelled, radio-com trolled 'missile designed primarily' as an air-to-air weapon to be carried on fighter aircraft as well as the homber types. There were several versions but the busic type was called Ms 278 V-Z is used a solid propellant.

[TM 9-1985-2 (1953), pp 203-5].

HTA. An abbreviation for mixtures of RDX (Henomes). TNT (Trotyl) and Al (aluminum), such as in the proportions 40/40/20. [See also PBL Rept No 85,160 (1946), p 15.] .

Hübner Presellants, parented in 1895, were prepe by mixing NC (aelatinized by mesos of 2-3% soln of K ansthogenets m ether-alcohol) with small quantities of nitrocephthol. nitromolanses, or nitrosugar. For instance, a propellant uned for military purposes contained 4 to 5% of nitronaphthal [maiel, Dictionaphre, Paris (1902) p 178].

Humani (Bunble Beat Nickname for a self-propelled mount consisting of 150 nm Medium Howitzer on the chasses of a Pzkpfw III/IV tank. (See also under Panzer).

Hydroxine Mydore in described in the gracial set of the manufacture in General set the Facility of Plates at Geneticles, Leverlases, Ledvistabel set is fescribed in RICS-Final in the 1974 (5).

Hydroxell described in RICS-Final in the 1974 (6).

ivarazoiiulana (Hydrocellulose

Described in the general section, it was reported that the Germans used it in some rocket propellants presumably to improve the burning characteristics. For instance the so-called Anmonpulver concurred 5% hydrocellulose and the EP (Einheitspulver) contained about 3% Hydrocellulose was also, used in some rocket propellants to increase the rate of burning at low temperature. (See Standard Propellant).
Reference: CiOS Report 31-68 (1945), pp 6-7.

Hydrogen Perculde (Wasscratolisuperoxyd). Its preparation and properties are described in the general section under Peroxides. It was used in liquid tocket propellants and in a special turbing designed for submarines by Walter. Several German methods of manufacture are described in

Several German methodo or manuscuse are ossertoset ais the following References: hydrogen Possuide Production by Electrolysis of 33 Per Cent Solutions (Deutsch-Gold and Silver Ansassie), BIOS Final Report 683 (1945) 23 V.W.Slater et al, The Anthraquinone Autoxidation Process for the Production of Hydrogen Percoide, CIOS Republic,

31-15 (1945) 3) J.McAulay, Hydrogen Perovide Manufactured by All-Lequid Process From Amnonium Persulfare, (Nil. 1982) 5, 1 CLIS Rept 31-54 (1945). 4) Jack May, Direct Synthesis of Hydrogen Perovide by El-crit Discharge, CIOS Rept 33-44 (1945).

See also T-Stoff, Rocket Propellants, Liquid and U-Boas (Unterseeboot) of Walter 1.

Hygronkopistier oder Foundtighuit (Hygroncopicity, Humidify or Moisture). Methods of determination are given in the general section.

Ignitar (Zünder), The following igniters are helefly described or listed in Reis 1, 2 & 3

A. Frietien (Pull) Type (Brennunder).

A. Shellon (Full) Type (Breanminder).

3. Z 24, with delay politics, was used in satick granades (Red I, p 23, 13 ± 3, p 283).

3. Z 24, with delay politics, was used in satick granades (Red I, p 23, 13 ± 3, p 283).

3. Z 24, with delay politics was used with eag granades, p 22. Z. with politic, was used with eag granades (I, p 23, p 24, p

1) Zabennand, 59, asset for the same purposes as asset (1, p. 85.1); a p. 25.3); (in p. 81.1); a p. 25.3); (in p. 81.1); instantial purposes as a proposed to the p. 16.3); (in p. 81.1); (in p. 81.1)

mines (1, p 83.03 & 3, p 296)
c) Hebelsünder (Lever Igniter), also called Schuke Ignitor, consisted of an inverted L-shaped tube, the vertical arm of which was acrewed into a mine. The

43. p 297) f) Welsamma Igniter consisted of a spring loaded striker bolt at the top of which was a pressure head. The bolt was held against the spring by a safety device consisting of a small pair of congs. After removing the tongs, pressure or a blow on the pressure head shattered the glass rod thus allowing the spring to drive the

power from low altitudes some had a hollow charge (weighing nose. This charge was derona-a non as it his the armor. The laced a hole in the armor (as led the AP bomb to enter inside int provided with a short delay-it was inside the target. In from premature detonation the ad the nose of the homb was nose. This charge was dete

Hethanol in general section.

ood, Flow in the general acction,

nderines and also on p 263 of

reeral section.

See general section,

ral section under Tax. e or Chemical Wood Pulp). See

or Musikus, such sa Acquetic, elly described under Guidence

anoquay get

known as Schmetterling (Butter-d, radio controlled, missile for d, radio controlled, massic to tions. Some versions were for alretorain it used liquid fuel cutries called Salmei. -201].

s a radio-controlled missile ns a regio-contribute majories he target from an aircraft. The hard was the He 293 C, He 293 D, He 293 B, He 293 C, He 293 D, [TM 9-1985-2 (1953), pp 201-3].

a rocket-propelled, radio-coain recurrepopulat, mano-com-inarily as as air-to-air weapon irrests as well as the bomber I versions but the bosic type t used a solid poppelima.

mixtures of RDX (Hexomes). tept No 85,160 (1946), p 15 3 .

in 1895, were prepd by mixing f 2-3% sole of K xanthogenate Il quantities of nitronaphthol, r. For instance, a propellant ntained 4 to 5% of nitronsphthols 1902) p 376.

name for a self-propelled mount . um Howitzer on the chausis of

cribed in the peneral section kusen Ludwigshafes

drozeliulese (Hydrocellulose).

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Reference: CIOS Report 31-68 (1945), pp 6-7, 8

Hydragen Peraxide (Wasserstoffsuperoxyd), its preparation and properties are described in the general section" under Peroxides. If was used in liquid-rocket propellants and

Peroxides, it was used in liquid-notest propellants and in a special rubbig designed for submarines by Valuer. Several German methods of manufacture are described in the following References:

1) B.E.A. Vigers et al., Hydrogen Peroxide Production of Electrolysis of 5) Per Cent Solutions (Desurcha-Gold and Silver Austalt), BIOS Final Report 633 (1943)

2) V.W.Slarer et al., The Authoroulone Automatistice Process for the Production of Hydrogen Peroxide (CIOS. Report 31-15 (1943))

3. J. McAulay, Hydrogen Peroxide Manufactured by All-L quid Process From Ananonium Persulfate, (NH.) S.O. J CL S. Repe 33-43 (1945). (4) 1-48 Aulay, Direct Synthesis of Hydrogen Peronide by El-optic Discharge, CIOS Repe 32-44 (1945).

[ See also T-Stoff, Rocket Propellants, Liquid and U-Bont (Unterserboot) of Walter ].

Hygrachapizitat oder Fouchetgheis (Hygrancopicity, Humidify or Moisture). Methods of determination are given in the peneral section.

funitor (Zinder). The following igniters are helelly described or linced in Refs 1, 2 63

A. Fricting (1911) Type (Seen Minder).

a) Zi Ze4, with delay polities, was used in stick greands a feel 1, pg 1, pg 2, pg 2,

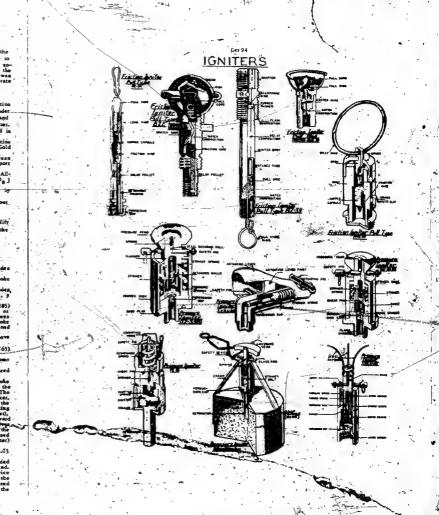
for some demolition therpus, to ignite safety tunes. for some demolition therpus, to ignite some made tendles and to booky-rap some. Teller mines and presades, tip 83.10 &3.2 p 285)

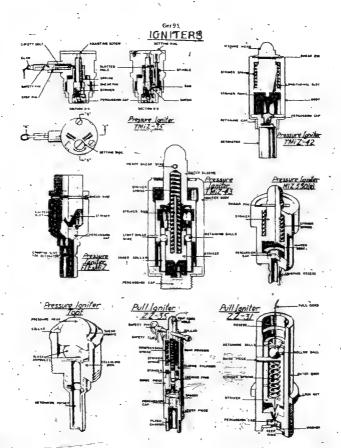
1) ZdSchnANZ 37 need for the same purposes as shows

1) ZaSchaAlZ 357 and for the same purposes as above (1, p. 83.11 a, p. 283)
2) BZ 42, delay 45, 462; mass more indicated (1, p. 165)
3) BZ 43, delay 45, 462; mass more indicated (1, p. 165)
4. Pressure Type (Druckabdide), irans mines and comprehensed the property of the vertical arm of which was accessed into a mine. The horizontal arm contained the percussion cap, stitles, striker spring and striker retaining pin. On top of therm was attended a lue, an actuating lever (constaining of a hollow metal trapping piner pivoted on a tiret), and a safety pin. After removing the pin. the downward pressure (as little as 40 lb) on the particular pressure (as little as 40 lb) on the particular pressure (as little as 40 lb) on the particular pressure (as little as 40 lb). The particular pressure (as little as 40 lb) on the particular pressure (as little as 40 lb) on the particular pressure (as little as 40 lb). The particular pressure (as little as 40 lb) on the particular pressure (as little as 40 lb) on the particular pressure (as a little as a lb) on the parti

-63, pc 47).

The property of the property of





striker against the percussion cap etc. The is designed for use as a push igniter in improvis or as an impact igniter for tile charges when u assault (3, p. 208)

g) SMrZ 35 designed for use in Schutzenn called Bounding Mine (3, p. 209)

h) TMrZ 35 (Tellerminenzunder 35), axed in

h) TMiZ 35 % iellerminenzunger 327, useu in (3, p 301) i) TMiZ 42, used TM: 35 (steel), TM: 42 and ulso called Pilzmine (Mushroom Mine) (3, p 303)

ulso called Prizanne (Nouthroom Mice) (3, p. 101)

1) Mil 3, and a above (3, p. 3) savine "a2 (Antoglass bottle mine) (3, p. 107)

1) Mil 2, 3106(2), an 'easter manual in German
in the British Antonic Mine 330 (3, p. 103)

1) Mil 2, 3106(2), an 'easter manual in German
in the British Antonic Mine 330 (3, p. 103)

1) Mil 2, 3106(2), an 'easter manual in German
in Tophininanoider (Pep, Mine Fusc) const
abid pressure head, inside the cylinder ner
woo glass approduce contenting liquids which
ignated the explosive train of the Pot Mine (1)

ignated the explosive train of the Pot Mine (1)

the mmounter (3, p. 104) (1) & gwax antificents
the mmounter (3, p. 104) (1) & gwax antificents

A pressure of shout 150 kg was nüfficient the ampouler (3, p. 100). C. Pull Type (Zugründer).

3. D. Z. 3), used in Schnens, some prepared by Z. 3. Single of the Schness of Teller marce (1, p. 81.04 g. 3, p. 1289). If the Schness of Teller marce (1, p. 81.04 g. 3, p. 1289). If the Schness of Teller march (1, p. 81.04 g. 3, p. 1289). If the Schness of Teller march (1, p. 81.04 g. 3, p. 1289). If the Schness of Teller march (1, p. 81.04 g. 3, p. 1289). If the Schness of Teller march (1, p. 81.04 g. 3, p. 1289). If the Schness of Teller march (1, p. 81.04 g. 3, p. 1289). If the Schness of Teller march (1, p. 81.04 g. 3, p. 1289). If the Schness of Teller march (1, p. 1289). I site. called Pull and Tension wire ignive. 2022, 35, consisted of a brass case contain cursion cap, striker, attiver spring (hecate Contain cursion cap, striker, attiver spring (hecate Compression spring, a retaining (locking), pastety pin. The top of plunget was conserved to the compression spring, a retaining (locking), pastety pin. The top of plunget was conserved with the plunger to be pulled under the plunger to be pulled upward against the of the outer apring. This permitted the top in the plunger to be pulled upward against the of the outer apring. This permitted the upper of the pulled proceeding the pulled of the country of the pulled of the country of the country

ros operacion, a snarp puis on the apilit ing ca atriber release plate to be drawn from the ig-thus releasing the striker spring, which rension (3, p. 268).

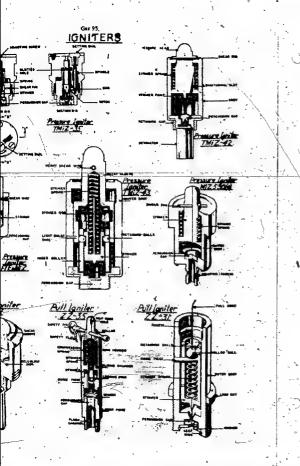
Aufarhlagrunder 355(h) for use in Dutch

Mine 355 (2, p 164)
F. Pull and Pressure Type (Zug- and Druckgund

by July and resource type of the assembly of nativehicle or antipersonnel mines, could be either by pull on a trip wire statched to the pull pin, or by pressure against the se (3, p.292).

b) ZZ 42, consisted of a bakelite cylindric

containing a percussion cap, a striker retains and a striker upring held under tension by and a striker spring held under lension of wire loop. Pulling on the tip wire attach release pin withdrew the pin thus allowing it to hit the percussion cap. The igniter coul operated by attaching a rip wire under struc-to the end hole in the striker and carefully the release pin. This igniter was designed



atrikes signiast the percussion cap etc. The igniter was derigned for use as a push igniter in improvised mines, or as an impact ignite for lift. Charges whon used in an assault (3, p. 278)
g) Salic 33 designed for use in Schützenmine, associalled Bounding Mine (3, p. 297)
h. Talic 23 for Cilleminisensatinder 35), used in T-Mi 35
h. Talic 23 for Cilleminisensatinder 35), used in T-Mi 35

called Bounding Mine (3, p. 299)

1) Talic 35 Kelleminnenshader 39), used in T-Mi 35

(3, p. 201)

2) Lowed This 35 (succi), TMi 42 and TMi 43, also called Filtanine (Mushroom Mine) (3, p. 903)

1) This 43, used an above (5, p. 340
1) FiltaMiz used in Filtanchersimine 24 (Antipersonnel plants 12, 100, p. 10

also, 'called Poll' and, Tension Wise Spriner, such as ZeuZz 35; consisted of a brase seas containing a percussion cap, spriker, striket spring (located inside a striket pring the striket pring to forced 'cavated into the upper open space, or carriag of the striket pring to force the simfler cylinder downwards. This pring the striket the striket chus permitting the repring the striket besides the striket release place from the striket chus permitting the repring the striket pring the striket into the open cases of the striket chus permitting the spring to drive the striket into the open cases of the striket chus permitting the spring to drive the striket into the open cases of the striket case the striket the striket into the open cases of the striket case the striket the striket into the open cases of the striket case the striket the striket into the open cases of the striket case the striket the striket into the open cases of the striket striket principal princi

(3, p 287)
c) Type 2 (Pull Percussion) ignitur was designed for use with the new type paracture ensigersoonel bomb but was suitable for use with mises and booby traps. For operation, a sharp pull on the aplit fing caused the For operation, a sharp put on the spite ring caused the atribut release plate to be drawn from the Ignitar body thus releasing the atribut apring, which was under tension (3, 9.285).

355(h) for use in Dutch Antitank

The Antickli proceeder 355(M) for use in Dutch Anticale Misse-355 (27) 164)

F. Pull and Pressurer Type (Zng- and Druckslander).

F. Pull and Pressurer Type (Zng- and Druckslander).

J. Dill. 25 (gaiver, used in the assembly of anticals, and the second of the second of the pull pin, or by pressurer against the setting head sides by pull on a trip wire attacked to the loop of the pull pin, or by pressure against the setting head (1) 27.242, consisted of a bishelic cylindrical cuising containing a prefusion of pressurer and a strifter special head of the pull pin of the

Stock mines and booby traps (1, p 83.06 & 3, p 193). Note: This imiter is listed in Ref I as 'Pull' Type, whereas Ref 3 lisss it as a 'Pressute and Pull' Type

c) SMIZ 44, developed for use in S-Mire 14 and to some improvised mines, consisted of a steel cylindrical case containing a percussion cap, atriker and spring.
The striker was retained in a cocked position by two The striker was retained in a cocked position by wa-winged detenas, to which two trap writes were attached. The detenas were held in position by a reasuring cellar riamounted on the casel and by a safety pin. After aming the device (by withdrawing the safety pin), a pressure that the safety of at 10 on the wanged detents opened then sufficiently of the control of the con-trol of the safety of the safety of the con-trol of the safety of the safety of the safety of G. Electric Type (Electric Goods) framounts, ESHIZ & convisited of a shonite. Goods framounts, ESHIZ & G. Electric Type (Elektric ber Zinder), Exist? de consisted of an exonite, Gooch funnel-happed housing, provided with a spite and contaming a striker, a spitea, provided with a spite and contaming a striker, a spitea, provided with a spite and contaming a striker, a spitea, and contamined the spitea, and contamined the spitea, and contamined the spitea, and spitea, and a spitea to the miner ressure on the prongs of any of the 18 igniters, depressed the release plunger and liberared the two steel locking balls in the head of the striker into the glass ampoule. The liberared electrolyte set up a current.

India causale on symme to care the strate into one that the care of the wire first the flash composition and finally exploded the HE charge of the misc.(1, p 8):08 a 3, p 300-1) and the misc.(1, p 8):08 a 3, p 300-1) and the misc.(1, p 8):08 a 3, p 300-1) and the care of the misc.(1, p 8):08 a 3, p 300-1) and the care of the misc.(1, p 8):08 a 3, p 300-1 and the care of the c

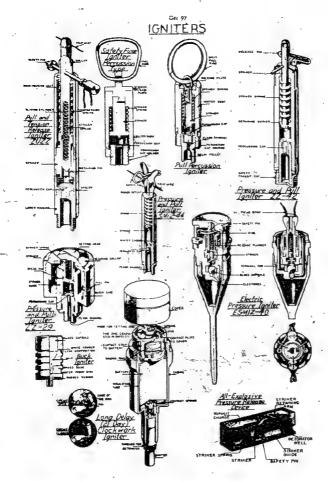
for delayed action demolitions consisted of a cylindrical baselite housing consisting a giasa supposite and other baselite housing consisting a giasa supposite and other perforations in the plastic lid into the reaction chamber, (plastic cylinder) where the metal daisy not was located, (plastic cylinder) where the metal daisy not was located, broke, the aring was released thus allowing the 'smiker to hit the percussion cap. The resulting flash initiated the internative, boosier and the sails HE charge (5,

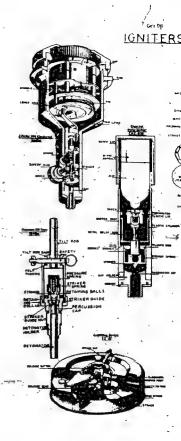
313-14) All Explosive Pressure Release Device, designed L. All Empleaive Pressure Release Device, designed for use as a booby-rap, was also usitable as an inginize in mires and other idems. The body of the device consisted of two oblong blocks of dolded explosive, Carlieved to be Hipstit, held together by roo hollow provided with wielder receives 10 ratio observations of the servation of the device -man placed under the object to be booby-rapped and as soon as the object was lifted the striker retaining arm of the device protocted upwards, thus releasing the satisfar. Thick there is no servation of the servation of

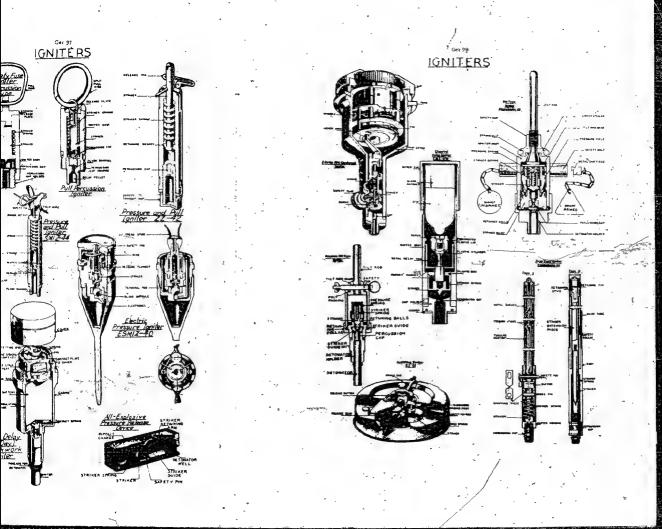
a) 21-Day Delay Igniter was used in conjunction with

a) 21-bay Delay Ignier was used in conjunction with Large heals demolitions where a long clear was re-quired (3, p. 199).

b) A-Feder 304 Ignier was used for the same purposes, an one previous against her is could be set for delay's of 8 Bechner (sound-shaped aluminum or beliefle body, housing a clockwork mechanism in the upper (wide) portion and a utriter assembly in the lower (narrow) portion. At the end of the prodetermined delay period, the letver sam on the rotating control disc bere against the trip lever, causing it to disengage the striber. The striker, driven by a spring, exploded the percussion cap thus initiating the main HE charge (1, p 85.09 &







3, p. 500?

A. Tile-Type igniber (Kipp sinder),

a) Kiz 43 consisted of a tilt rod, and a 24-isch extension
rod consected in a cylindrical body constaning the
rod consected in a cylindrical body constaning the
id 15 to 25 lb \*served in any direction on the tilt rod
(or 1½ lb if the extension rod was used), paysed the
pressure piece to slide down. This allowed the retainer
its apring The inspect of the article against the percursion cap set of the explosion train. This gainter
was used in anistant and antipersonnel assee as well.

cussion cap set of the exposion train. This ignited was used in natitals and antiperationnel mines as well as in booby traps (1, p. 83.076 & 5, pp. 312-14)

b) KiZ. 43 (New Type) retained the bavic principles of KiZ. 43 except that it had an entirely different safety device. It is described in Refs. 1, p. 84.07e and 3, pp. device.

313-15. Described projects (Entertagnationer), such as facilities of the filt of piletical upper casing the hare place, the cliectwork and attiter mechanism, the device was place the base place, the cliectwork and attiter mechanism, the device was placed under a misso constends of the control of the cliectwork and the surface has been object and the surface has been of the surface and the surface has been of the surface (as p. 16.5 as 3, p. 35-19.)

release bettes. Removal of the weight from the release bettes of the igniter allowed the surker spring to force up the near by seems of the besseled stop, thus releasing the strates (2, 165 at.) pp. 184-19).

A) Rez. 42/1 connisted of a metallic cylindrical body-and as extension composed of fire trubular sections placed and removation to the control of the strategy of the control of the control of the strategy of the control of the contr

the statement of the prevention of the property of the propert

References: 1) Ason, Land Mines and Booby Tenpa, War Dept Field Manual FM 3-31 (1943)

2) Anon, Enemy War Maserials Inventory List, Supreme 2) Anon, Enemy War Maserials Inventory List, Supreme Headquarters Allied Expeditionary Force (1945) 3) Anon, Germso Explosive Ordnance. Dept of the Army Tech Manual TM 9-1985-2 (1953)

Isolius. Bogs. According to Faghwarts. The Ordanece Sergest. Let. 744, p. 21. the Cermano employed igniver where the strillery, ammunition. The bags. 1904 to the other control of ammunition. The bags. 1904 to the sawn to the base of the propelling the region we either attached by means of 8 strings. The standard substanceesployed in the bags during by II was a finely prayed nitrocellulous. Coca also spirition and under Propellants. igniter Compositions (Zindestra). Igniter compositions used for propellants are listed under Propellants and the igniter compositions used for Tracers are listed under Tracers.

Ignition (Zündung). Ignition of a propellant in wenpons up to 30 ms was accomplished in Germany by means of a with an igniter contained with an igniter contained with an igniter contained calibre 50 m 280 ms had an igniter contained a calibre 50 m 280 ms had an igniter contained a calibre 50 m 280 ms had an igniter contained a calibre to a contained to the contained of the cont

la addition to the primer extre igniters were seen to both the front and rear of each section of the propelling

bother three three and area or team sections on the programs.

For Plate has a some Army gone the une of black boundar was considered understrain on account of its hymoscopicity and brittleness. It was reported that charges aubscred to joiling contained broken up ghains which caused doe majid registers of the propellant, butch better exestive seen obtained spinion of the propellant, butch better exestive seen obtained spinion contained Makeania (Makeania and Makeania a

In some cases, posteriolativ at low loading densities, where the Brildung did not give satisfactory ignition.

Grundledung (Base charge) of special-digap propellane was used. The flake was of a size intermediate between the rain charge of the tube propellane and that of the

Practically all German cannon propelling chargen confined the propelling chargen confined of the propelling chargen confined the primer flash a clear passage to the front of the propelling charge, of harwalled confined to the of the propelling charge, of harwalled confined to the of sharp land charge, of harwalled confined to the of sharp land charge, of the charge charge, of the charge charge, of the charge charge of the charge charge of the charge cha

fenition (Inflammation of Deflagration) Tomperature Test (Estaindungs- (Entflammungs- oder Verpulfungs-) Temperaturpobe. For descripcion of the test nee. Kaut-Netts, Chemiache Unyersuchung der Sprens- und Zünderberg, Brownschweig, (1944), pp 224-6 and in the general section. The ignition temperature of some explosive and pro-

echnic compositions was determined by F. Lenze, SS 22, 369-71 (1932).

(See also Flammability Text).

I C Weche ((G Wan). During WW II, the I G Farbeniadustrie developed several synthetic wiews some of which hadhigher melting points than catural waten. These waters, were used for phlegmatizing explosives such as PEIN and RDX.

Reference: A G Marth , The Chemistry and Technology of Wages, Reinhold, N Y (1947), p 389;

Himminering Consentitions and ifforminating Sombs (Leuchtanixe und Leuchtbombes) See, under Pyrotrechnic Compositions and also in Southacher, Spieng- und Schiesstoffe, Zürich (1948), pp 124-9.

## Incondiusy Bomb. See-ustler Bombe.

Incendiary Companitions, and Incendiary Bamba. Brandstoffe order Brandsieze and Brandbonben J. According to Ref. 2, p. 191 most German inocediary projectifies consisted of an Elektron (such as MgA), or, MgAl, alloys) caning filled with thermile (such as Fe oxide 7-10-76 and Al 30-24%), Other fillings were white, phosphorus, oil or compositions such as: perceivem 87.7, polystyrene 11.8 was perceived by 61.0, polystyrene 11.8 was perceived by filling for 4, p 50, One type of projection was perceived by filling for the perceived perceived of the perceived perceived of the perceived perceived perceived of the perceived perceived of the perceived perceived perceived of the perceived perc

(B4); consisted of a steel outer case into which two tubes were inserted, the outer of jelluloid and the other of paper; the properties of the control of th

bombe). Sew of the German shells listed in Ref 5 verijacreolisty. One of them, 50 mm HE-lac-T (5 cm BeSparPara 41 t-pany was mired in AA Gan, Flat 4(16 397). Another was 38 mm [sec-Shrapuel (8.8 cm GeB-Schr Fink) used in AA-4-was Flat (8.5 %) and 37 (9 448).

Some German incendiaries are described by Stettbacker (Ref 3).

References:
1 Lt Lisovaki, BioS Final Report 1233 (1943), p. 2.
2) E.W.Bateman, C.OS Report 32-15 (1945), pp. 6. dt 18-19
3) A.Saschuchen, Spang, and Schiestoffer Zerich (1948), pp. 124-9
4) TM 9-1965-2 (1953) 5) TM 9-1985-3 (1953).

Industrial Explosives. See Connectial Explosives.

Inactial Conflorine Culdence System or Bellistic Guidane
System. See under Guidanee Systems for Missiles.

System. See under Guidance Systems for Mineiles.

Infrance Guldania System, See under Guldance Systems

brien Ber Vammen (Infraited Cannonlage). Due to the like that clede covered objects could be medily described by infrared; photography, even if unsouldage coloring had been aborted; neveral dyn. most developed by the 10 Farther aborted; photography, even if unsouldage coloring had been aborted; neveral dyn. most developed by the 10 Farther aborted; photography of the

bapolin. The same given by Dr. Vallet to hydrogen permitted of vary high concentration (such as 1953), lengths can be desired by the second property of the seco

habitation Continui insteaded to control the harsing of vector propellants and those for assistance of AFO. He control that the control of th

intelescopies of adar initiotyprospectif (initiating or Priming Espisaire). See Priming and Initiating Composition. Initiation (faitinging Composition). See Priming and Initia

· ing Composition.

Initiating Composition Initiation Composition (Z. power of primary of

Ger 100

by loading an efficient of the detonators with a tested, compressing cap to one or bord Test or 2) Lend B

These testes a American Sand Test

Reference: A.Stetch (1933), p 134.

J (Pulver). One of Am bichromate 14. geintininer 2,5% [ p 134 ],

Jophyalvov (Hunting propelloats, we'v black powder and as ful spotting smoke Other anokelens; were; Amberie E Walsrede, Reference: Bipmawi Jung Tiper (Tank Dennisting of 128,00 pmaner)

Jet Proposition in 1 Some information of Instanted by the Wal 30-115 (1945).

Jet Propolation Fool.
Ji-Fodos 304. Clos Igainer most in de pp 309-13 ].

Josephit - Sop Your

developed during WW References A.Ducço Paris (1947) PP 23-Kulkamanı ala eter.

intimate mixture in It contained 20.5 a Reference: R.J. Mori pp 12-29. Keltspritten (Cold-

Kultrachen, Kultrachen, Kultrachen, Kultrachen, Kultrachen, Kultrachen, Kultrachen, kultrachen besti

Kampher (Campher)

Kenne (K) (Com designations of Ger equivalents:

ersined

Igniter Compositions (Zindentze). Igniter compositions used for propellants are listed under Propellants and the imiter compositions used for Tracers are listed under Tracers.

Ignitism (Zilodung). Ignition of a propellant in weapons up to 50 nm was accomplished in Germany by means of a primer, while larger weapons required a primer combined primer, waits larger weapons required a primer combined with an igniter containing black powder. Army weapons callber 10 to 260 mm had an igniter cong 2g of black to the containing the containing to use 12 of black between the containing the cont

an used.

In addition to the primer extra igniters were news to oth the front and ress of each section of the propelling

both the front and rew of each section of the propelling of charge.

For Flak and some Army game the use of black powder we storyllowed underlinkle on account of its hygocoropicity reason to the propelling of t

pairer which contained NC 24.0, black powder 73.8 and displayed to 0.25. This monour of NC was sufficient to bind the black powder together into hard grains.

Never the Stilledment claim of the black powder stilledment of the black powder than the black powder tha

above NahinaNP,
Practically, all German cannon propelling charges
consisted of long-tubes and it was considered ensential
to ignize these at both ends, in order to ensure for the for ignue there as notes upon, as over to unsure to the primer flash a clear passage to the front of the propelling charge, of this-walled cordite tube of fairly large diameter was pieced along the axis of such section of the charge. References H.H.M.Pike; CIOS Report 31-68 (1946), pp 7-8.

lanition (inflammation or Dellagration) Temperature Test Entzindenge- (Entflammunge- oder Verpulfungh-) Tempersturpede . For description of the test see . Kant-Mers. Chemische Untersuchung der Spreng- und Zundnioffe Braunschweig, (1944), pp 224-6 and in the general section. The ignition temperature of some explosive and pyro-

technic compositions was determined by F. Lense, SS 27, 369-73 (1932). (See also Flammability Test).

I G Weeks (IG Wax). During WW II, the 1 G Farbenindustries developed several systhetic waters some of which had higher melting points than natural waxes. These waxes were used for phleymatizing explosives such as PETN and RDY

Reference: A C Warth , The Chemistry and Technology, of Waxes, Reinhold, N Y' (1947), p 389.

Illuminating Communitiess and itiuminating Sambs (Lauchtanthe und Leuchtbomben) See under Pyrotechnic Compositions and siso in Stattbacher, Spreng-und Schieustoffe, Zürich (1948), pp 124-9.

Incordinty Somb. See-under Bombe

Incendiary Commentions and Incendiary Sembe. [ Brandstofic oder Brandsatze und Brandbomben ] . According to storic our ocandantse uno granquomen j. According to Ref 2, p 18) most German incendiary projectiles com-sisted of an Elektron (such as MgAI or MgAI silver) casing filled with thermits (such as Fe oxide 70-76 and Al 30-24%). Ocher fillings were white phosphorus, all compositions such as: petrolsus 87.7, polyasyruss 1.8, and phosphorus 0.3% (Ref. 4, p. 50), the type of prospectific was people by filling a container with penniss lumps of died peops routh. Indiscoved the versuants of six and massing (BA), constated of a need outer case into which we tubes were inserted, the outer of reliabol and/of unased operations of the pace is between the pace in her ween the pace in the pac

scattering the incending mixture.
(See also Bombe Smadbombe, Flanchombe and Springbone Only few of the German shells linted in Ref 5 were

unity new of the German shells tended in Ref 3 were tunned and Does of them, 90 mm HE-Inc. 75 cm HS-Spafferr 41 L-basel; was paired in A. Gao, Fish 4(ty 507). Another 41 L-basel; have provided in A. Gao, Fish 4(ty 507). Another A. Spam Fish 18, 15 and 17 (i) 443.

Some German incondinctes are described by Sentimoleg (Ref 3).

1) Lt Linewski, BiOS Final Report 1235 (1945), 9°2. 2) E.W.Batesson, ClOS Report 32-13 (1945), pp. 6. & 18-19. 3) A.Stectincher, Springs and Schlesstoffer, Zürich (1948). 99 124-9 45 TM 9-1985-2 (1953) 5) TM 9-1985-3 (1955)

Industrial Explaniture, See Conneccial Explonives Inertial Gravitation Guidanae System or Ballintia Guidanae Bratum, See ander Guidance System for Mineiles,

Infra-Red Consullage. See Jafen-Ret Termen & . .

Inferned Guldanie System, See under Guldance Syntome for Marilley.

Info-Rat Tamong (Info-Red Canoullage). Due to the fact that cloth covered objects could be needly descreted by information and informatic photography, even if canoullage coloring had been adopted, averant days, were destributed by the IC Famburg of the Coloring that the Coloring the Coloring that the Coloring types of dyna were considered, on he worthy of considerations. Antime Black, Diphenylamine Black, Carbon Black (when printed with organic hadem) and leducations (10 Key Saperiir. Hartmares (20 Keyen T-18 (794)), pp 14-17.

Ingelia. The name given by Dr Walter to hydrogen perceide of very high concentration (such as \$5%), Ingolin can be meet as a fact or as a source of stored payers. As a feet ir produces superheated steam which can be used for driving nisher biston negines of turbines. As a source of oxyme, it was tried in automarines in order to allow them to use their main engines while subsecreed, (See also Hydrogen Paronide and T-Swit).

tabilities Continui insteaded to control the lursing of the propolimets and those for mestametechnoid (ATO). The comparison of the control of

Intital amplentungelf ader Intitaleprengetoff (Initiating or Priming Explosive). See Priming and Initiating Composition.

Initialous (Initiating Gaugenition). See Printing and Initiaing Composition.

Initiotina Compositions (Injustinglouivecoffe). To Frinary and Initiating Compositions.

initiaring property power of primary or mitiating explosives may be determined by tonding an officiry cap (such as the types used for to 8 decounters) with a weighed quantity of an explosive to be tested, compressing the sample and subjecting the loaded cap to one or both of the following tempt 1.) Ernd Plane Test or 2) Lead Block Compression Test.

These team are used for the same purpose; as the American Sand Test and Nail Test, described in the general secrido. . Reference: A.Sretebaches, Schaess- und Sprongetoffe, Leisnig

(1933), p 134, I (Palver). One of the sporting propellants: guacotton 79,

Am bichronate 14.0, K bichromate 3.0; moisture 1.5, and gelatinises 2.5% [ Brunswig, Day southlose Pulver (1926)

Jacquelver (Hunting or Sporting Propellant) Two kinds of propellants, were used in shorguns and sporting rifles, black powder and anokeless propellmen. The first successful sporting smokeless propellant was "Schultze-Pulver". Other amokaless propelleges used for sportial purposes weret Amberit , E C (Pulver), J (Pulver), Sexonis and Reference: Brunswig, Dan tauchlose Pulver (1926), p. 134.

Joed Time (Tank Dearroyer Tiger). A self-propelled mount consisting of 12R men A/T gan on Pakpfw VI (See under Panner).

Jat Proposition is triefly described in the general sections Some information on German jet units designed and manufactured by the Walter Werke, "Kiel is given in CIOS Report 30-15 (1945). Jot Propulsion Fuel. See under Sondertreibandf.

J.Fodes 194. Cockwork long-delay 64 hour to 21 days) igniser used in demolition charges [ Thi 9-1985-2, (1953), pp 309-13 ].

Josephy . See Youckite is the Belgion section. Junkers Schmetterling, One of the justed missiles (q v )

developed during WW IL Ruference: A.Ducroco, Les Armes Secrètes Allemandes. Paris (1947) PP 25-95.

Sethemmon superior (Chall-Ameronium Nitrate) was an intimate mixture in granular form of Chall-Raff (Resistant, et contained 20, to 21% and was used as a fertilizer. Reference: R.J. Morley, 8105 Final Rags 389, Izen 22 (1946), pp 12-29.

Koltspritum (Cold-equirting). See Cold Extrasion in this and in the search arction.

Kultrockun, Kultrockung (Cold Stretching), See Autofratinge in the general section.

Kumpher (Camphor). See general section.

Kennes (E) (Canson, Piece of Gue) Table 25a gives designations of German artillery weapons with their English

Fajdinmone Flugai wehrinnes Gebirgehaubiene Gebirgahanose Ka mpfmage skanoos Knaone Eisenbakei Knoone ohne Rücklauf leichte Feldhaubiene leiches Ennens oder hiches Geschetz leiches lefesteriegeochies Passess bereichtes achwere Feldhambiene schwere Kasses ader orbuses Geschütz schweren fafauerie- ? (See also under Vespoor

FK Field Gun Blab Assisierraft aus Gobii Mountain howitset Gebl | Houstein gum KwK - Tonk gun EE Railroad gue KoR Recoilless gue

Light field howitzer called by the British "gun'- howiener" Light gun ; (IG) Links informery gwo IIG . (11G)

Ancitank gun Heavy field bowiczes \*FR a K Heavy hee u IG (= 1G)

Kanane shoe Ricklouf. See Recvilleen Guan-

"Kerl" Morter, See "Thur" and "Karl" Wenpone. Kurtusche . See Cartridge.

Ka-Sain The term assigned to RDX (Hexogen) prepd by the interaction of hexanine, Am nitrace, nitric soid and scetic selveride. It is described in this section under Hexogen-

Pek

"Kashada" Torost Indicating Flore. See under Flore. . .

Kaasan Englosives, Several explosive hixtures were proposed by W.Kessen of WASA-G. One such explosive was patented in 1938 (Ref 1). It consisted of a regular blascing explosive plus as additional charge consisting of NG and/or nitroglycol mixed with a large amount of alkali bicarbonate. This mixture tended to produce inert gases and to absorb heat. If desired charges containing bicarbonase could be inserted between normal charges. These explosives were suitable for use in gaseous coal mines (See also Bikarbit and under Shaethed Explosives).

'Another patent granted to the same person (Ref. 2) dealt with the manufacture of moist Am nitrate explosives contg carbonaceous macerials.

References: 1) W.Kessen and WASA-G . Brit P 493 984; (1938) CA 33 2719 (1939) 2) 'Ibid, Ger P. 679, 511 (1939); C A 33, 9647 (1939).

KH-Charge. The designation for a compressed charge consisting of 4-8 pellets of TNT wrapped in paper slued on the inside with an acid-free glue (such as denting Vinnapas, erc). The waspoed charges were dried as 60-70 and then dipped in paraffin. They were used as bursting charges in Naval mines [ See PB Reps No 925 (1945), p 48 1.

Kinetiz (Kinetite), One of the oldest (1884) gelstinous explosives containing no NG relating. It convinted of K chlorate ?5, antimony aulfide 3, nitrobenzene or nitrosoluene 21 and collodion, cotton 1% [ Naoum, Nitroglycerin (1928), p 353 1.

King Tiger or Rayel Tiger. See Konigstiger, under Panter.

Kippzunder 43, (Till-Type Igniter).

Kitchen Salt Emplesives. See Kochsalzsprengstoffe.

KIAZ 40. An impact-firing none-fuze used in some sockets, such as 8.6 cm R(L/4.5) and 8.6 cm R(L/5.5). [ TM 9-1985-2 (1953), p 256 ]

KMA Block. One of the substitute explosives, See under Erantasprengstoffe.

Knollowecksilber (Mercury Fulminate) (M.F.) in described in the general section under Fulmanatus. Genna methods of preparation (from mercury, nitric soid and alcohol) are given in PB Rept No 95 613 (1947), section Co. M.F. was used by the Germans in some priming compositions. See also A.Stettbacher, Spreage and Schiesscoffe, Zilrich (1948). pp 95-96.

Knallstiber Bliver Fullningte). See general section under Fulminates and Stettbecher's book (1948) p 96.

Knallsundachaue (Deronming Fune) . See seven | nection under "

Knotmuschine (Kneeding Buchine). An apparatus used for mixing solid ingredients in the prepence of liquids, Several types were used in Germany such as the Columnar Type (Sindenknermaschine)Ref 2, pp 105, 106 and Ref 3, p 237). Verner-Pffeiderer Misch- und Knetmaschine (Ref. 1. p 75 and Ref 5, p 227) and others.

1) E. de B. Barnett, Explosivés, Yan-Nostrand, N Y (1919) 2) P.Naoum, Schiess- und Sprengeroffe, Steinkopf, Deceden.

3) A.Stettbacher Schiese and Sprengstoffe Barth, Leipzig. (1933).

Kalekainder 43 (Sono Type Janiter). See under Janiter-

Kochaal zaneongatoffe (Litchen Salt Explonives). Substitute explosive mixtures containing large amounts of Na chloride, which were used during WW IL Some of these mixtures are denctibed under Ernatzsprengproffe.

Kehlen-Cerbenit See under Kohlensprenusvoffe. Kehlen-Kerenit III Kehlen-Seilt

Kahlansprangstoffe (Coal Explosives). This was a group of explosives permitted for use in coal

Kuhlon-Curbonit. NG 25, K\_nitrate 34, Be nitrate 1,

flour 38.5, spent tan meal 1 and gods ash 0.5%; heat of explosion 306 kcal/ka; temp of explosion 1561 C. velocity of detonation 3160 m/sec, density 1-16 and Trank tent value 237 or (Ref 2, p 401 and Marshall, 2. p 492).

Kahlen-Kerenit III NG 4. K chlorate 68. Na chloride 14, paraffin 8, nitronaphthalene 5 and wood meal '1%; onygen belance -12% and Tennal test value 195 cc(Ref 1). Kahlan, Sulit . NG (gelatinized) 12.5, ment 2.5, nitrocompounds 7.0. Am nitrate 41.0 and alkali chloride 37.0% oxygen inlance -2.6% and Trauzi test value 260 cc (Ref 2, p 441).

Kahlen Wagtfalft 1. NG 4.0, Am nitrate 83 D, K nitrate 7.0, Be diffute 2.0, seenl 2.0 and TNT 2.0%; oxygen balance \$16.4% and Trauzl seet value 230 ct (Ref 2,

Kohlon-Woosfalit IV. NG 3.2, Am nitrate 73.0, K nitrate 2.8. alkaline kloride 15.0, meal 1.0, and DNT 5.0%; oxygon balance +8.8% and Traval test value 200 cc (Ref 2,

Kohlon-Woutfullt V. NG 4.0. Am nitrate 83.0. K nitrate 8.0, Ba nitrate 2.0, potato meal 1.5 and Montas wax 1.5%; oxygen balance +33.5% and Trauxi rest value 230 cc (Ref 2, p 435)-

References; 2) P. Naoum, Schress- und Sprengerotfe, Dresden (1927), p 147 2) P. Nassau, Nitroglycerin, etc., Baltimore (1928), pp 435

Kuhlan-Was folit. See under Kohlensprengstoffe,

Maker As employing of the carbonite type, such as: NG 25. K nitrate 26, Ba nitrate 5, wood men! 34, and attach 10%. There was also a Super-Kolan, so explosive used in England [ Mambell & (1917), p 375 ].

Kolfie (Kolfite), A smokeless propellest parented in 1890 by H.Kolf of Bonn, which consisted of mixtures of nitrated cereal flours, moss, oil cakes, residues of factories manafacturing organic products such as starch, sugar, boor, alcohol .. etc .. with saltperst previously anterated with

Reference: [.Doniel, Dictionnaire, Paris (1902).p 394.

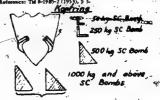
Kantinutaritako Variabren (Continuous Methoda) of manufacture of explosiven such as those of Schmid Meissner and Biazzi were used in several German pinnts. Some of these methods are briefly described under

Misroglyceria, Reactit and Triniuocoluci, as well as in the Belgies, Dutch, French, Swedish and Swiss sections,

1) A.Svetthecher, Schiess- und Sprengstoffe, Berth, Luipzig (1933), no 174 & 335 2) A.Sernbucher, Sprong- und Schienntoffe, Raacher, Zinich

(1948), pp 60 at 97 3) A.Serubuchet, Polyomy y Explosives, Gill, Burnos Airel

Repiring (Hand Ring). Then it was desired to avoid excessive procuration against test targeter and so prevent riceches against see targeter, the procuration against see targeter, these worst astached over the nessed of bonden such as SC (HE cylindrical, general purpose) or some SD (APP cylindrical, thick walled). Give also Anti-Ricochet Platen) Reference: TM 8-1985-2 (1955), p 3-



Keennit V. O. during WV 1. N 10. nitronapht and Sprengstol Note: 'Accordi Koronst was

K Pulver, S

Ger 102

Kraftzahl (KZ of power (see Lead Block T errors is 'du' which is obse ing gelatin, f error, Neubaexpansion pro the weight o expansion of ficing severe obtain values curve giving this exponsio be determine is called Krai Table 2

Substance

Biactics geletin NG · NC(13%) PA TMT . DINE

Note: It may KZ values f are decermine powerful exp higher. References

(1) R.Neulmer 2) A.Marchall 3) A.Seretbac "Kranich".

Reference: T Krousrohr.(Cr

Kronbuch Mi propullant wi in Flak, it flank reducer 31-62, p 5).

Krimbook (Pa Double base Nimat Palver (CKOS 31-62, Kitchen Suit Explosiven. See Kochsalusprengutöffe.

KIAZ 65. An impact-firing nose-fure used in some rockets, such as 8.6 cm R(L/4.5) and 8.6 cm R(L/3.5). [ IM 9-1965-2 (1953), p 256 ].

KHA Black One of the substitute explosives. See under Ernatusprengatoife.

Knollawecksilber (Mercury Fulminare) (M F ? in described in the seneral section under Fulminates. Gention methods of preparation (from mercury, nitric acid and alcohol) are given in PB Rept No 95 613 (1947), section Q. MF wan used by the Germans in some priming compositions. See also A.Stettbacher, Spreng und Schieseroffe, Zürich (1948). PP 95-96.

Realisibee, Milvar Fulminate). See general vention under Fulminates and Spettbacher's book (1948) p 96.

Knollzundschner (Detonming Fuse) . See genezal section-under " Funet.

Knowneshine (Knesding Machine). As apparatus used for mixing solid ingredients in the presence of liquids, Several types were used in Germany such as the Columnse Type (Sinlenkogemanchine)Ref 2, sp 105, 106 and Ref 3, 2 237). Werner-Pfleiderer Minch- und Knetmauchine (Ref. 1, p 75 and Ref 3, p 227) and others.

1) E. de B. Barnett, Explosives, Van-Nostraed, N Y (1919) 2) P.Naoum, Schiess- und Sprengstoffe, Steinkopf, Decaden.

3) A.Stertbacher, Schiene und Sprengecoffe Barth, Laipnig.

Kelekninder 43 (Sanp Type Igaiter). See under Igniter-

Kochseinsprengstuffe (Kirchen Sait Explosives) Substitute explosive mixtures containing large amounts of Na chloride, which were used during WV II. Some of these mixtures are described under Erentrabres astoffe.

Kehlen-Cerbenit Kohlen-Kerentt III See under Kohlensprennstoffe. Kehlen-Selit

Kehlenserenssteffe (Coal Explosives). This was a group of explosives permitted for use in coal minés:

Kohlen-Curbonit. NG 25, K\_nitrate 34, Be nitrate 3, flour 38,5, spent tan meal I and toda sah 0.5%; hear of explosion 306 kcal/kg, temp of explosion 1361 C. velocity of deconation 3160 m/sec, density 1.16 and Trauzi test value 235 cc (Ref 2. p 401 and Marshall, 2, p 4921.

Kohlen-Karenit III NG 4, K chlorate 68, Na chloride 14. paraffic 8, nitronaphthalene 5 and wood meal '1%: oxygen balance -12% and Trauxi test value 195 cc (Ref 1). Kohlen-Seile NG (gelatinized) 12.5, meal 2.5, hitro-compounds 7.0, Am nitrate 41.0 and alkali chloride 37.0%; oxygen belance -2.6% and Trauxi tent value 260 cc (Ref 2, p 441).

Kablom Burfalie 1.NG 4.0, Am aitente 83.0, K nitrate 7.0, Be siretie 2.0, seed 2.0 and THT 2.0%; oxygen belonce 616.4% and Timus, cent value 230 ct (Ref 2,

Kahlan-Wastfalts 3V. NG 3.2, Am nitrare 73.0, K nitrate 2.8, altalisticalistics 15.0, menl 1.0, and DNT 5.0% oxygen balance th.2% and Tentral cost value 200 cc (Ref 2, p 435)

Kahlan-Wantfallt V. NG 4.0, Am mitrate 83.0, K mitrate 2.0, Be nitrate 2.0, porato meal 1.5 and Montain wax 1.5%; oxygen balance +13.5% and Trauxi cest value 230 ex (Ref 2, p 435)....

1) P. Rassim, Schienz- and Sprengessife, December (1927). 9 147 2)P. Novim, Himoglyceria, etc., Baltimore (1928), pp 435 & 441.

Kahlan-Wastfalle. See under Kohlensprengutoffe.

Water An explosive of the carbonise type, such as; NG 25, K nitense 26. Be nitros 5, wood meal 34, and starch 10%. There was also a Super-Kolan, an explosive need in England [ Marchall 1 (1917), p 375 7.

Kalfie (Kolfite). A. umokelens propellnet parented in 1890 by. M. Kolf of Bean, which consisted of mixtures of nitrated come! House, moss, oil cakes, residues of factories manulacturing organic products such an starch, sugar, bant, alcohol, etc., with saltperer previously anturated with

Reference: 1.Deniel, Dictionanire, Paris (1902), p 394.

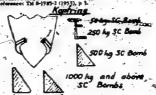
Kontinuisriishe Variebren (Continuous Methoda) of manulactum of explosives such as those of Schmid Meissner and Biassi were used in several German plants." Some of these methods are briefly described under

Missophyceria, Pentric and Trinitrocoluct, as well as in the Belgion, Dutch, French, Swedish and Swiss sections, 1) A Streetharher, Schiege- and Sprengstoffe, Barth, Leipzig

(1933), so 174 & 335 2) A.Saruthacher, Spreage and Schiesstoffe, Bascher, Zifrich

(1948), pp 60 at 97 3) A.Scoubucher, Poiveens y Explosives, Gill, Burney Signe

Repfring (Hoad Ring). Then it was desired to avoid extre-gree preservation against lead torpete and to prevent ricecher against one margine, rings were statched over the concest of books much as CC (HE cylindrich, general property of the context of the cylindrich, the world Cort. size Australia. Ricochet Plates) Reference: Tid 9-1985-2 (1955), p 3-



Keeplt V. One of the permissible explosives developed during WV 1: NG 4, K chlorate 65, Na chloride 14, naprhalene 10. nitroasphthalene 5 and wood meal 25- [ Naoum, Schless-

and Sprengsroffe, Dresden (1927), p 147 ]. Note: According to Mershall, v 3 (1932), p 112, the name Kompit was given in 1931 to Chloratit 1.

K Pulver. Same as G Pulver.

Kroftzahi (KZ) (Strength Number), in the usual determination of power (strength) of an explosion by the standard Trauxi Lead Block Test, (see general section) one of the principal errors is due to weakening of the walls of the cavity, which is observed with powerful explosives such as blasting gelatin, P A., TNT and NG. in order to eliminate this error. Neubner proposed that, instead of measuring the expansion produced by a standard weight often explosive, the weight of explosive required to produce a standard expansion of 300 cc be determined. This may be done by firing several charges of different weights in order to obtain values below 300 ec and above it. After drawing a curve giving the relationship expansion vs weight of sample, the expansion in or corresponding to a 10 g. sample one by determined by interpolation. This calculated expansion is called Kraftzahl (strength aumber).

Table 23b lines KZs for some embosives

Substance	Trausi Tout Values shapeved by various investigators using a 10 g sample	KZ calculated by Neubone for n 10 g sample		
Bleering geletin NG NC(13%) P.A. THT DNR	520 to 610cc 515 to 600 525 to 420 300 to 365 205 to 300 250	534ce 540 400 365 150 511		

Note: It may be concluded from the above values that the KZ values for highly powerful explosives are lower than are determined by the aranderd Trauxl test, while for lane powerful explosives (such as TNT, or DNB) the KZ is higher.

Referencess

1) R.Neubner, S.S. 23, 54 (1928) 2) A.Matuhall, Explosives, v 3 (1932), p 143

3) A.Southacher, Spring- and Schlenstoffe (1948), p 113.

"Krunich", As accounte proximity furn intended for nome guided minuties as, for incounce, Societ X-4.
Reference: TM 9-1985-2 (1933), p 216.

Krousrake (Cross Take), Sed Distance Piece.

Resembled Mires (RM) Pulver, Double-base DEGINANC propellant with a calorific value of 710-730 kcal/kg, used in Fisk. It commined a small amount of K nitrate as a flash ceducit, in lies of K nullsac used in G Pulver (CDG)

Krimbook (Pulver) ubne Nitret aber mit Dikitersbied (ROD). Deuble base DEGON-NC propellant similar to Kromback Mierat Pulvere eticope that K nitrate was replaced by DNT (CIOS 31-62, p. 5).

Gua aistraft 140 erain howicze acain puis k g==

leved gree oilless gus he field howieuer entled be British "ges - bow-

be gree he infeatty 240

iceak gw vy field howitener TY KWE

vy lahinty gu

na Cuni Wespens.

Hoxogen) people by the

nitric acid and aceric section under Hexogenee under Place.

ve mintures were pro-One such explosive consisted of a regulat ani charge consisting th a large amount of aded to produce inert ed charges containing

ween normal charges. une in sessous coal Sheathed Explosives. name person (Ref 2) Am nitrate explosivés

P 493 984 , (1938) 33, 9647 (1955).

empressed charge conped in paper glued on a se dextrin, Vinnapas, ed at 60-70° and then as burnting charges in 945), p 48 1,

iest (1884) relatinous ine. It consisted of K bunzene or nitrotoluene , Natroglycerin (1928),

Following are some of the achievements of Krummel

Fabrik personnel: A.Pressing of emplorives. In loading ammunition (auch as deconstors, boosters and projections) one of the most important requirements is to maintain the same density of loading for each type of ammunition and for each kind of explosive. As a rule, the effectiveness of an explosive in higher at maximum density, but in some cases such high density is undersirable because it might cause dead-prenning (as in the case of mercuric falminate) or cracking of pellets (as in the case of Note, which is PETN densitized with 10 parts of wanhilbe react required density of charge was obtained by weighing accurately each portion of the explosive d proceeding as described below:

In the preparation of pellets for boossers, the weighed masses of an explosive were transferred to one or two dozen molds placed in portable holders underseathacorresponding number of filling funnels functioned together in perforated places. During filling. loss of explosive was carefully avoided so that the required density would be obtained. After sacertaining that each sold was properly filled, the formed placed the holder with molds under a press located behind a strong wall and operated by response control. Any spilled material was collected and blended with the hext batch of explosive. The pressed pellets were removed and inspected for dimensions and density.

Noon bost of the pressing was done with phlagmatized PETN (usually with 10% wax), which was used to form tharpen for the 37mm tank shell? 30mm solid or hollow .. charges, 20 mm bigh explosive charges, and incendiary explosive charges, colored smoke charges, etc. The 20mm incending charge consisted of about 80 perts of PETN (previously phicamerized with 10% wax) and 20 parts of aluminum. The charge weighed 6.6g. Some TNT charges were also compressed, such as those for shrapnel burster tubes, emplosive charges for some mines, etc.

B. Ejecting projectiles. Special projectiles which elected incendiary missiles on approaching a target (such as an airplane) were developed but did not come to the manufacturing stage. These projectiles contained several hollow steel cylinders, each of which was filled with an incendiary mixture consisting of Ba peroxide, aluminum and iron. A charge of about 15 g of HE was required for ejecting each cylinder from the projectile and to impare to it an acceleration of about 1000 m/sec. Each of these cylinders burned in flight and if one of them hit is combustable object (such as a sasoline tank of an aurolane) s fire or even an explosion could take place.

C. Space explosions with curbon dust. Preliminary work was done on the development of a bomb which was charged with a HE and coal dust, it was presumed that the deconation of the HE would explode the coal dust which would become scattered in the sir surrounding the bomb, thus producing a high pressure (blast) effect at distances as far as 50 m from the center of the explosion. These bombs were intended for antisirtraft Purposes, Experimen's with coal dust were not

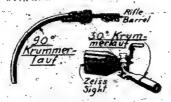
auccessful, but Al, or Mg duses could be exploded in air when charged into a bomb mixed with a powerful HE and a small amount of chlorate. The research was not completed (See also Explosive Powered Vortices) D. Shooed charges. See under Hobiliadung

E. Flash reducing compounds are described separately F. Structural amplantion are described asparately. Reference:

O.W.Stickland et al, General Survey of Explosives Plants, PB Rept No 925 (1945), Appendix 3 and Appendix 7.

Krummee louf (Bent Barrel). A special bene-barrel attachment to a gut, invented by Col H.Schade of the Rheimsgrall-Borsig Co, was available in two degrees of bend 90 and 30. The lirer type changed the course of the buller by a tight angle and was known as the "Around the Corner Gen" intended to be used (in a ball joint) in the pasts of the tank where it was necessary to protect the blind spots. The barrel was 18% long and about I in dismeter. Its range was short and its fire was not accurate, it was fired at tandom because no hight was provided. The second type, bent) have seculd be arrached by means of an adapter to one of the service rifles, such as the MP 44. It was provided with a prismatic optical sight (designed by Zesse), which permitted fately, accurate shooting from behind solid barricade. The operator of this equipment was thus protected from enemy fire: Both berrels used the 7.92 mes short (kurz) bottle-necked carrudge.

A more detailed description may be found in the book: Ph. B. Sharpe, The Ritle in America, Funk & Wagnalte. Co. N Y , pp 636-40.



Krupp Meus (Krupp Mouse). See Experimental Tanks, under

K-Suis. The term assigned to Hexogen (RDX) prepd from hexamine, ammonium nitrate and nitric acid (See under Heungen in this section).

K-Stoff (K-Substance), A highly dispersed silics SiO. prepd by a special process. It was used during WW II in some Teran Explosives [ PBL Rept 85,160 (1946), p. 3 ] .

"Kunelblitz" (Bullet Lightning), An armored AA vehicle having a 30 mm twin gun mounted on a Pakpiw III (See under Panzerl.

Kugel K-"Kury" Apparatus. See item 11 under Bombe. Kussitraibnine 43 (KTrMi 41). A spherical floating mine weighing about 90 lb Recognition Handbook for Agents Ammunition, Sup Has AFF (1945), p 241 l.

Kumulativa Zündung. See Gegenläufige Zündung.

"Kurt" Apparatus (SB 400 Skip Bomb). See item 11 under Bombe.

Eurzucklusnzunder (Shore-Circuit Primer or Igniter). Several varieties, such as the Schilfler, Reinecke and Eindrahtguader (one-wire primer) are described in Beyling-Drekpof, (1936), pp 216-222.

Logerhest andigheit oder Heltherkeit (Stability in Storage or Keepin Quality). Several tests are described in Kast-Metz, Chemitche Untersuchung (1944), pp 758-61, 320-27 344-45 and 460-61 (See also Varmis gerversuche).

LANDMINEN (Land Mines). A great variety of land min-mere used during WV II by the Germans as can be seen from the following information taken from References 1 - 5: from the following information taken to have a selected and the following information taken to the following information taken to the following information to the following information taken to the following information to the following information taken to the following information to the following information taken the following information taken to the following information taken the following infor used to prevent the detection of the mine by electric detectors. Pressure on the "pressure plate" forced it down onto the bend of a glass spriter, containing a central glass subs filled with a reddish ignition mixture of unknown composition, Crushing of the central tube produced a flash which passed to the deconator which exploded the same. Pressure on the cardboard water exploses the cume, Pressure on the cuschoard of the same would not set it off. The mine was filled with 11 bot TNT (Ref 6, p. 261).
Antitank bline, called Pengerschaellmine, consistent of a weeder box filled with picfic acid (13.2 lb). There

were two types, A and B, very similar in construction.

The booster in both cases consisted of 200 g of as explosive such as PETN/way, Type A was schusted by

amplication and as PETN/wax. Type A was actuated by presented on the box list, causing the shearing of two friends weeden dwedle and pressing out the list pin of the ZZ 42 fasters. Type the broaden dwedle and pressing out the list pin of the ZZ 42 fasters. Type the broaden dwedle and examing pressure on the heady, of two Buck igniters (Ref. 5, pp 9.45 and 6, p. 202 called Forwardsmedmine 3 languages and the state of the two deep the two deep the state of the two deep two deep the two deep two deep the two deep two deep

in the ignitor Z. 4.2. The freed suriter, driven by a spring, set of e persuasion can decoupled, because an application of the set of expression of the set of the se Premare plate. The same could so free in one, so free ways: a) Pressure on the ligh sufficient to one, so free way and the same of the sam function in case an attempt was made to lift the charge of INT from the tray. Total weight of mine was 20.5 lb (Ref G, pp 264-5 a 272-3)

(Ret 6, 99 264-) # 272-5; Heavy Antitank Mine (Sahwere Pungermine) was made of cast from and contained 37 lb of Picric Acid, Tora weight was 100 lb. The mine was fired by a downward presents exerted on the cover plate, which pivotage on the trainisons. This pressure compressed the head pressure lighter, which fixed the charge. The daine was used for root blocks where action has been static for, a period of time, Total weight was \$100 is (Rei 6, pp 265-72)

pp 202-73
Antitook Minen, called Tellerminen (Plate-Shaped'
Minens, we'n of the following varieties: Tellermine
35, Tellermine 42, Tellermine 43 and Tellermine 29, 27. Reservance 46. Restriction 43 man lestermine 27. Type 35 mine entired in two varieties, both of them made of acrel and similar in confinentias. The 2nd variety, designated Tellermine 35. (Seed) has the pressure place and of corrugated steel following scenario.

They were filled, respectively, with 11 a TNT. Both mines operated by pressure of 200 lb or more, This depressed the igniter sheared the pin holding the striker in the coc etc. The Tellermine 42 was similar to the the entire upper surface. Pressure of 250forced the pressure cap down. This con-heavy pressure plate spring and detonate The Tibi 43 | also called Pilamine (Mushroor aimiline to the Tildi 42 except that the press solid, ie there was no threaded hole for the the taniter and no acrew cap. The walls of the shaped place were thin and there was no shaped place were thin and there was no under the pressure. Like Tellernine 42 with 12 ib of TNT. The mine operated pressure on the mushroom lid. This crust walls and forced the bead of the striker igniting the mine Tellemine 29 slso de. igniting the mote Tellamana 29 also de-was a light antitant more constructed of doned and had three adaptors to 2024. The mine was explored who pufficient applied to one or newesti ignition. Tota (Ref. | & 2; Ref. ap. pp. | 10.1 | 13.1 | 14.1 | (Ref. | & 2; Ref. ap. pp. | 10.1 | 13.1 | 14.1 | (Ref. | & 2; Ref. ap. pp. | 10.1 | 13.1 | 14.1 | (August According to Ref. 2; the Thi 4) (P. during by III as Pictainany Assensi Commands a shad Thy 15.4. The bootse, pollets consisted.

charge 10.87 to of Amatol, constating of A and TMT 567, The booster, pullets consisted PETN and 12% Nontan war.

8) Post-haped Aptitant Atine (Tepfonine Al. Saubepan Mine, confisted of a plastic with 12.5 to f TMT or 50/50 Amatol, of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, of a plastic statement of the mine was 20 lb. Under a load, (330' ib) the pressure plate sheared along and thus came to rest on the head of the in turn moved down and crushed two small in turn mèwed down and crusbed two small; decreted hashing the justice body. The cheat chemicals, which on mixing produced in it turn set off the decomption had chemicals of the decrete between the chemicals of the decrete between the chemical transfer of the decrete hashing of the chemical the chemical transfer of the

warn a casy pressure in amoust 37 thick, addes of the top of the pot west two round housed 2Z 42 igniters. Two hollow pas down inside each being carried; the leag taneous fuse connecting ZZ 42 igniters taneous fuse connecting ZZ 42 ignitems charges located at the bottom of the same as Pieric Acid. Pressure on the ful pur out of the igniters, that relevating the attrikers, etc. The Antipersonnel Clay M of a round clay pot 8 indianeter and 3 out of the third provided with A Tevers. Pleric Acid was detonated by means of train, consisting of four ZZ 32 ignivers, a

a booster, when a pressure equal to man's weight was applied to the lid (Re-10) Antipersonnel or Antirank Aluminum Mi with Cheddige (7 ib) and had a TNT book and the lid were of a flattened cylindrics DZ 35 Igniters together with No'8 d inserted in boosters located 120" spirit insected in poorters located 120 upper main explosive charge. Pressure on the the center of lid set off one or more of the and the mine went off, Total weight of a (Ref 6, pp 273-4)

11) Light Antitank Mine, IPaMt (Leicher which could be converted to antiperane ninted of two naucer-shaped, sheet metal an O-shaped container for 5 lb of TN1 cover which served as a pressure plate. were built into the mine and apaced more igniter housings downward over This action compressed the outer at the steel locking balls to be forced out

tucesors, releasing the striket, ett. bas mine to antipersonael use the bottom is liquid K-Na allow and the other other maratome of the achievements of Krumme

plusives. In loading annunition (such boosters and projectiles; one of the requirements to to maintain the same a for each type of ammunition and for plosive. As a rule, the effectiveness in higher at maximum density, but in high density is understrable because dead-pressing fas in the case of meror cracking of pellets (as in the case Is PETN densitized with 10 parts of required density of charge was obtained neately each portion of the explosive described below:

aration of perfets for bocasers, the sen of an explosive were transferred dozen molds placed to portable holders orresponding number of filling tunnels ther in perforated plates. During filling, louive was carefully avoided so that: lensity would be obtained. After succeseack mold was properly filled, the ed the holder with molds under a press ind a strong wall and operated by l. Any spilled material was collected with the heat batch of explosive. The ets were removed and inspected for d dessity.

pressing was done with phleamatized 10% was), which was used to form me sank shell? 70 mm solid or bollow .. h explosive charges and incendiary colored smoke charges, etc. The 20 mm consisted of about 80 parts of PETN eized with 10% was) and 20 parts of ne weighed 6.6g. Some TNT charges ed, such as those for shrapnel burster ses for some mines, etc. etiles. Special projectiles which ejected

les on approaching a target (such as e developed but did not come to the tage. These projectiles contained steel cylinders, each of which was incendiary mintury consisting of Ba um and iron. A charge of about 19 a uired for ejecting each cylinder from ed to impact to it an acceleration of c. Each of these cylinders burned in of them hit a combustible object fauch ank of an airplane) s fire or even as ake place.

palens with cuben dust. Preliminary on the development of a bomb which a HE and coal dust. It was presumed ion of the HE would explode the coal become acattered in the air autroundbus producing a high pressure (blast) es' as far as 50 m from the center of here bombe were intended for antinir-Experiments with coal dust were not

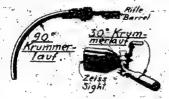
successful, but Al or Mg dusts-could be exploded in air when charged into a bomb mixed with a powerful HE and a small amount of chlorate. The meearch was not completed (See also Explosive Powered Vostices) . D. Shaned charges . See under Hohlladung

E. Flash reducing compounds are described separately F. Structural assissives are described senarately.

O.V.Stickland et al. General Survey of Explosives Plants. PB Rept No 925 (1945), Appendix 3 and Appendix 7.

Krummerlauf (Bent Barkel). A special bent-barrel attachment to a gun, invented by Col' H.Schade of the Rheinmetall-Boraig Co, was available in two degrees of bend 90° and 30°. The first type changed the course of the bullet by a zight angle and was known as the "Around the Corner Gua" It was intended to be used (in a ball joint) in the parts of the tank where it was necessary to protect the blind spots. The barrel was 18% long and about 1" in dinmeter, Its range was short and its live was not accurate, it was fixed at random because no hight was provided. The second true (3) bent) barrel could be attached by means of as adapter to use of the service sifies, such as the MP 44, it was provided with a prismatic optical sight (designed by Zeles), which permitted fairly accurate shooting from behind a solid barricade. The operator of this equipment was thus protected from enemy fire: Both barrels used the 7.92 mm abort (kurz) bottle-necked carttidge.

A more detailed description may be found in the book; Ph.B.Sharpe, The Rifle in America, Funk & Wagnalle. Co, N Y, pp 636-40.



Kross Mays (Krupp Mouse). See Experimental Tanks, under

K-Soin. The term assigned to Hexogen (RDX) prepd from bexamine, ammonium nitrate and nitric soid (See under Hexogen in this section),

K-Stoff (K-Substance), A highly dispersed silies SiO prepd by a special process, it was used during WW II in some Tetan Explosives [ PBL Rept 85,160 (1946), p. 3 ] .

"Kweetblitz" (Bullet Lightning). An amored AA wehicle having a 30 mm twin gun mounted on a Pakpiw III (See under Panzer).

Rugel K-"Kurt" Apporatus. Sen item 11 under Bombe. Kugoltreibmine 41 (KTrMi 41). A apherical floating mine weighing about 90 lb Recognition Handbook for Garman Ammunition, Sup Hqu AEF (1945), p 241 l.

Kumulutive Zündong. See Gegenläufige Zündung.

"Kurt" Apparatus (SB 400 Skip Bomb). See item 11 under

& ur unehlungnunder (Short-Circuit Primer or Igniter). Several. varieties, such as the Schäffler, Reinecke and Eindrahraunder (one wire primer) are described in Beyling-Drekpof, (1936), pp 216-222,

Logorbestendickeit oder Heltberheit (Stability in Storage or Keepid Quality). Several tente are described in Kape-Metz, Chemische Untersuchung (1944), pp 258-61, 320-27 344-45 and 460-61 (See also Warnlagerversuche).

LANDMINEN (Land Mines). A great variety of land min-mere used during W II by the Germans as can be sch from the following information taken from References b - G: 1) Austinal: Mine, called Papparine, because it was mad-of special cardiound "Pappa" a non-meralitic subgreace ased to prevent the detection of the mine by electric axed to prevent the detection of the mine by electric detections. Pensauri on the "pressure plage", forced it down care the head pl a glass ignites, containing a causal glass tube filled with a reddink ignition matriace of unknown composition, Causking of the central tube produced a flash which passed to the 'detounter which suppleted the mine. Pensaure on the cardbaard of the mine would not set it off. The mine was filled of the mine would not set it off. The mine was filled to

with 11 ib of TRT (Ref 6, p 261)
Astinack Mise, called Panaerschoolimine, consisted
of a wooden box filled with pieric acid (13,2 lb), There were two types, A and B, very similar in construction. The booster is both cases consisted of 200 g of an explosive such as PETN/wax. Type A was actuated by

The booster in both cases consisted of 200 g of a supplearive use the both cases consisted of programme and the both cases of the case of reo "bear wises; b) Functioning of an antifitials or trap wise; c) Electrically, by remone control; d) Bodys-tap wise; c) Electrically, by remone control; d) Bodys-table lot; w) Reversing of one ignites ZZ 42 with its wings below the each pressive plant so that the chains could function in case an attempt was made to lift the charge (Art 6, pp 26-7) a 272-3) lieavy Asitiank Mise (\$chower Pentromine) was made of cast ions and constants 37 b of Pietric Artis, Tous

se case toos and constained 37 lb of Pictic Acid. Torsal weight was 500 lb. The since was fixed by a downward pressure exceted on the cover plate, which sjivotted on the transiona. This pressure compressed the shair pressure ignities, which fixed the charge. The fains was need for root blacks where action had been natic for a period of time. Togal weight was 300 lb (Ref 6, pp 265-7)

Assizable Minea, called Tollornines (Plate-Shaped Mineal, were of the following varieties; Tellernine 35, Tellernine 42, Tellernine 43 and Tellernine 29. 35. Telletmine 42. Tellermine 45 and Tellermine 29. Type 35 mine entired in two nativities, both of them node of oten and similar in confirmation. The 2nd variety, designated Tellermine 35 (Steel) had the pressure plane made of corrugated steel Tellermine steerings.

They were filled, respectively, with 11 and 12 lb of TNT. Both mines operated by pressure on the lid of 200 lb or more. This depressed the igniter housing and sheared the put holding the arriver in the cocked position. etc. The Tellermine 42 was similar to the 35 except that the pressure plate was similar and did not include the entire upper surface, Pressure of 259 Jb and over forced the pressure cap down. This compressed the heavy pressure plate spring and detonated the mine. The Tibli 43 [also called Pilamine (Mushroom Ming)] was 1.56 1196 43 laws caused resource face to the characteristic as a similar to the Till 42 except that the pressure in was solid, it e there was no threaded hole for the insertion of the ignitive and no screw cup, the walls of the makehoom shaped plate were thin and there was no heave, spring under the pressure. Like Tellgramer 42 it was filled with 12 1b of TNT. The mise operated by downward pressure not the makehoom lid. This churched its light walls and forced the head of the striker down, thus igniting the mine Tellonniae 29 also designated T-5 igating the mine Tellomane 29 also designated, To-was a light antitant more constructed of abeet seed. It was all the author to the seed of the seed of the charge of the seed of the seed of the seed of the designation of the seed of the seed of the seed applied to one of several ignition, Total weights, of mines were as follows This 35 20 bt, TM 35 (seed) (28 bt, TM 42 20 bt, TM 43 18 bt and TM 20 bt, 25 bt, CM 18 ct, Ref 4, pp. 31 0-16.04 & cp. 92.75-70.8. And the seed of the seed of the seed of the seed of the seed during by II as Pleashord Artena TM 18 the seed of the see

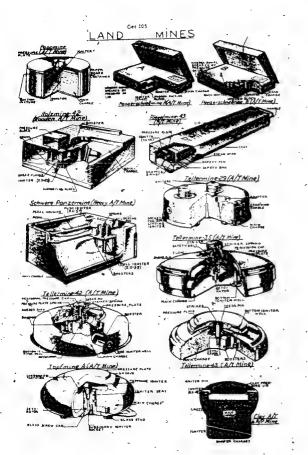
during by II at Picatiany Areand contained as the barser-change 10,57: bo of Amaton, consisting of Am nirate 44 contained to the Amaton and the Amaton and the Amaton PETh and 127 Months of the Contained An iso-Called Saucepas Mine, consisted of a plantic body Illied Saucepas Mine, consisted of a plantic body Illied with 11,27; b to T NT or 50/50, Amatol. Tocal weight of the mine was 20 lb, Under a load, of at least 150 kg (330.1b) the pressure plate sheared along its groove and thus came to rest on the hand of the igniter. This in turn moved down and crushed two small glass capsules in turn maved down and russhed two small glass capsules located inside the ignites body. The chipsules contained chemicals' which on mixing, produced a flash. This in turn set off the detointed and then the HE charge of the mine (Ref 4, p 81.08; 5, pp 26-9 and 6, pp 271-27).

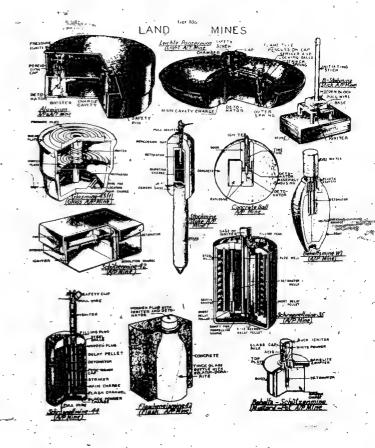
of the since (Ref 4, p. 81.08; 3, pp 26-9-and 6, pp 271.2). Clay Mines were of two typics Anthenia, and Antiperanousia. The Antimak Mines considered of a basked clay pos 800 with a clay pressure it? Antimak Mines considered of a basked clay pos 800 with a clay pressure it? Antimak Mines considered of the top of the pot week two round bulges which housest 2.22 Az ignitures. You hillow passages leading the considered of the bottom of the main charge, such many for the considered of the bottom of the main charge, such an Fictic Acid. Presslyre on the life passed the plant artikers, etc. The Antiperconnel Clay Mine Consistent of a round clay pot 8° in Mainteen and 5° high, with a Pictic Acid was determined by meran of the explosive of Picric Acid was detonated by means of the explosive

a booster, when a pressure equal to as little as a man's weight was applied to the lid (Ref 3, pp. 38-41). Antipersonnel or Antirank Aluminum Mine was filled with Chedute (7, b) and had a TMT booster. The body and the id were of a Battened cylindrician shape. Three DZ 35 igniters together with No'8 detonators were to boostern located 120' apart inside the mann explosive charge. Pressure on the sides or in the center of lid set off one or more of the three/igniters, and the mins went off, Total weight of him was 20 lb (Ref 6, pp 275-4)

11) Light Antitank Mine, IPaMi (Leichte Panzermine), which could be converted to antipersonnel use, nor-singed of two saucer-shaped, sheet metal covers forming an O-shaped container for 5 lb of TNT and an outer cover which served as a pressure plate. Five aniters were built into the mine and spaced radial seround it. Pressure crushed the mine cover and forced one or more igniter housings thousand over that plungers.
This action compressed the outer spring, allowing the seed locking balls to be forced outward into upper recesses, releasing the atriker, ett. For converting the

mine to antipersonnel use the bottom igniter nuts were Note. According to Dr. Hans Walter, one capeute contained liquid K-Na alion and the other ethnicarrate or attric acts.





removed and the mine, resting on threaded ands of plungers was placed on a hard flat autface. Light bessence of the mine cover gebrassed the autist wine brankers are bracker one a such such anciech relite pressure on the mine cover organization of their sinks and forced the plungers upward into the ignitive housings. The mine weighted 9 lb (Ref. p. 81.05 and 6, pp 274-5) 12) Antipersonnel Mine, Glasmine 43(6, was made of glass and contained 7 or of HE such as TMT or Pictic Acid. and Contained 7 or of HE such as TMT or Pictic Acid.

The lid was a thin glass plate and served as a shear plate. When sufficient pressure was applied, the lid plate. When surricient pressure was applied, the lives broken and this action equaled the top, of the Buck igniter or tripped the actuating leves of the Schuko igniter (Hebelsinder), depending on which Schuko igniter (Hebelsinder), depending on which seems and waterpraned by device was used. The mine was made waterproof by applying a cement putry around the lid (Ref 4, p 82.06;

applying a cement purty around the interest of the 5, 50 and 6, pp 275-60 Stickmine, called 8-Stubmine, was made of woods-as's box 3½ x 6 x 10 inches, the continued a 112 blick was not specified. On top of the box was mounted a wooden support to hold a wooden the por was accusted a wooden support to hold a wooden block with an initiating strick. In the base of the block Mag.1, metal hook to which was attached a wire connected with the eye of the pall igniter 2.2 [5], locared to the cover of the bass. Movements of the strick, purious wire which set off it all contained to the strick, purious wire which set off it all cold sheekings, consisted [6].

[4] Antigeracanel indicate body attached to a wooden attick, about 1.4 [6] [6].

concrete cyminatica, pumy accorded to a wooden accel, about 1.4 long, drived into the ground. The mine contained a atendard boephole cartridge weighing 100 g and a pull igniter detohator asanghly. The concrete of the body held some pieces of the body held some pieces of the form. of the body serie asset previous when the mine exploded. A pull or pressure of 9 to 17 lb was sufficient to set of the mine (Ref 4 pp 82.02 and 6 pp 276-7)

out of minuse (rest-up) deals among pp 4:00-21.
Antipersonnel Contrem Bail Mass, which weighted about 1,2 lb, contained HE (about 1/2 lb) and an igniteration assembly. Some abrepted places were embedded in contrate. The mine could either be placed in the ground by rolled down a lill or cliff into granty troops, in the last case the igniter was pulled by hand, prior to rolling the ball, thus igniting the time

(safety) (use connected to the primary charge of the decountr (Ref 4, p 82.05 and 6, pp 277-8). Note: It seems that this nine was also called the Rollbombe

(Kolling Bomb) -16) Antipersonnel Mine, called Schutzenmine 42, abbreviated as Schumine 42, consisted of a wooden box containing a 14th demolition block together with a 22, 42 ignites a 140 occasionation between together with a \$2.6 42 ignifer and & reference on the lid pushed the pin out thus freeing the arriser. Total weight was 1.1 1b. A modified wession of Schumine used the ZZ 35 igniver (Ref 4, p.82.04 and

6, pp 278-9) 17) Antipersonnel Improvised bline (Behelfsmine W-1)
was made from captured French 50 mm mortas shell
from which the nose dute and tail fine had been removed. trom which the none suze and that the had been removed. A Buck chemical ignier and a derivation were fitted inside the cavity in the HE charge, which was either. Pieric Acid or granulated TNY weighing 4 on. A pull or pressure of one less than 35 lb was required to

or pressure of nor less than 35 to was required to set off the mine (Ref 6, p 279)

18) Antipersonnel Mine, 3-Mi 35, which might mean either Schrappellating 35 or Schutzenmine 35. The mine was also, called Bouncing Mine because prior to the ex-plosion the inner case of the mine was projected up-ward 3 to 5 feet. The British called this mine the "Fruit. Tin' because it resembled a tin can in size and shape. The mine consisted of an outer steel case and an inner canister which held about 61/2 oz of TNT or Ametal surrounded by about 350 shrapnel balls. A central arrel tube tunning axially through the mine, contained in its upper part an ignite; and in its lower part a 4½ amound delay pellet. A black powder charge for ejecting the mine, was located beneath the inner canister. Three desonator tubes were spaced radially around the inner canister, 120 spart, and a short delay element was canister, 120° apart, and a short delay element was fitted into the bottom of each tube. The mine operated by pressure or by pull. In either case, when the smiter was fired its flame ignited the 41 second delay element which in turn ignited the expelling charge. The resulting gas pressure found the inner container upward into-the air and at the same time ignited the short delay pellets in the three detonator tubes. The delay in these tubes was sufficient to permit the mine to time in the air before the deconators in the tubes were set off. The detonators then exploded the main charge and the alrapaci balls were dispersed in all directions. The effective range was 200 yards. Various antiliting devices were employed with this mine (Ref 3; 4, p 82.01

and 6, pp 280-1)
19) \$-Mine 44 was similar in design to S-Mi 35, that the S-Mi 44 used a push-pull type igniter (SMiZ 44) (which was not located in the center as in S-Mi35) and the mine detonated at a predetermined height of about 36" (Ref 6, pp 279-80).

Note: According to Ref 5, p 82.01-e there were other modifications of 5-kine and Ref 3 describes S-ki 41.

20) Elemine 42 (Flascheneismine) was an A/P Mine in

the form of a wide mouth bottle, intended for use under ice. The bottle contained 5 lb 10 oz of Gelatine-Donerit and was provided with a pall or pressure igniter. The mines were also used as antipersonnel land mines. For this they were encused in contrete containing abrapa el (Ref 6, pp 281-2)

numpuet (Ket 0, pp 281-2) Behelfnechützenmine was an improvised A/P mine in the form of a mustard pot and was loaded with powdered Picric Acid (4 og). The mine was covered by a pressed amel lid with the Buck ignitor accurbed by means of an adapter. The detonator was inserted in the center of the life charge. A moderate pressure on the top of the ignites was sufficient to set off the mine (Ref 6

pp 282-3). Abbreviations: A/F Antipersonnels A/T. Antitask, HE High Explosave.

1) A.B.Schilling, Pic Ama Tech Rept 1246 (1943) Tellerminel 2) A.B.Schilling, ibid 1377 (1944) (Tellermine Land Mine J.P.Wardlaw, ibid, 133 (1944) (Antipersonnel Mines

S-35 and S-41) 4) Anos, Land Mines and Booby Traps, War Department Field Manual FM 5-31 (1943-1944), pp 81.01-82.06 5) Anos, Mines in the Specifick, intelligence Bulletis,

March, 1945, vpp 24-43

6) Anon, Cerman Explosive Ordanace, Dept of the Army Technical Manual TM 9-1985-2 (1953), pp 261-83 Note: The following mines (which are not described in the above References) are listed in the "Enemy War Matterials inventory List", Supreme Hendquarters, Allied Expeditionary Inventory List?, Supreme Hendquarters, Allied Expeditionary Force: [1947], pp. 156-71, Respensions of Emprovised Republish, Lundonino T. 40 (h) and Mo.2 (h) (Dutch Land Minez), Lundonino I. 40 (h) and Mo.2 (h) (Dutch Land Minez), Supremental Control of Control of

Loud Axide. See Bleinzid.

Loud Paraulde. See Bleiperoxyd.

Load Picrore . See Bleipikrat.

Lund Styphoute (Bleitzinitrorenorainat). See Trizinat.

Louflot Rocket. See Propagiada Rakete,

Loonit (Leonite), Permissible explosive consisting of K perchlorate 35, Am nitrate 10, Na nitrate 3, crude TNT 11, wood flour'7, NG 4 and alkali chloride

Reference: MiGium et al. Dizionario di Chimica, UT-ET. Torino. (1951), p 166.

"Looperd". See Experimental Tanks under Pauxer.

"Loopsid" or "Annie Annie". A 280 mm Railroad Gua. Model 5 (28 cm K-5), designed during WW II by Gessner

(See also Gessacs Gun and under Weapons). Leuchthombe (Illuminating Bomb). See under Bombe

and Flare. Lauchtspuraatue ader Lichtspuraatus. See- Tracet

Compositions. Lover, Igniter (liebelzunder)/ See Pressure Igniter, under

Lignefel. A highly compressed laminated wood used for the construction of the fina of some rockets; e.g. the Wheightechter [ TM 9-1985-2 (1953), p 227 ].

Linnare Sprangatoffwarks G m b H, Berlin. See under Warplants and Arsenalt.

"Liquid Rocket Propollents, See Rocket Propellants, Liquid.

Liviciole Com or Squeexp-Bore Con. SerNote under Tapered Bore Con.

LPZ Mine A light antitank or antipersonnel land mine. It is briefly described in TH 9-1985-2 (1953). e 274.

LT (Low Tonsion) Electric Detender. See Gasleus Delay

Luchs (Lynx), See under Panzer.

Lowed Sectional on Charge Cracking Plant) operated during WW II at the Schlobasch Fatrik, D A G. It reposented Street of the Schlobasch Fatrik, D A G. It reposented with the section of t an air cooler and two water circulated gas cooling towers.

The resulting SO was used documen manufacture of

Reference: F. Heppenstall et al, BIOS Final Report 1634 (1946), pp 9-13.

Levicen, Trade name of Polyvinyten hands. According to CIOS Rept 21-3 (1945), p.5 this plantic was unascisfactory for injection molding since it had a Multing point of over 200°C.

Lynn, See Luche, under Panzer.

M/71 Hormal-Pulver. Black powder used by German Infantry previous to the investion of smokeless propellant [ Daniel (1902), p 414 ] . ......

m 48/91; M 91/94 Pulver Smokeless propellante man afactured at the end of the last century by the Vereinigte Koin-Rostweiler Pulverfabriken at Rettweil. Wittenberg [See Daniel, Dictionnaire 1902), p 414].

Machine Gun (Maschinengewehr). Ser under Venponn.

Muchine Gon, MG. 42 (Maschinesgewehr 42) is a 7.92 mm weapon developed in 1942 and which served during WW. It as the basic weapon of the infantry sense. All its pasts were manufactured by atamping, it could

Vire up to 1,2 de scription .30 . 352-58 ( U S Navy, E v 1 (1951), p

Made-up-Chai in PB Rept the following replace the b A Targe 6 ft, long, m thick, was same mater through whi

made of an numerons ho inner tube with glains and calorific to convey propellent cl It was so-called "

Systems for M Magagaluta 1 section, was solventiese that MgO g The compos 0.25% Mg is (Sec also und

principle.

"Madrid" Info

Magnetiz-Beitl under Guidenc Mannyskraft also books o Mannel . Trad

the general : galutininat a COLLOR. Referencer p 160 me Manävameliv

The following sauchlose .F diphenylami b) gencottos 0,5%. MAN-Sels (

and a mp Que of the was as follo Methyle

nitric 1 at 'the.

on threaded ends of d flat surface. Light o the igniter housings. 31.05 and 6, pp 274-5) f) was made of glass a TNT or Pictic Acid. nd served as a shear was applied, the lid risating lever of the depending on which a made waterproof by a lid (Ref 4, p 82,06;

ie, called B-Stabmine x 6 x 10 inches, it specified. On top of pport to hold a wooden the base of the block tached a wire connected tached a wife content of the stick, pulled the factor, pulled the factor, personal of the consisted of hed to a wooden stick, ground. The mine coartridge weighing 100 g nembly. The concrete the mine exploded. A was sufficient to ser

5, pp 276-7) . Mine, which weighed 1 1½ 1b) and an igniterpnel pieces were emhill or cliff into anemy igniter was pulled by thus igniting the time primary charge of the so called the Rollbombe conmino 42, abbreviated

wooden box containing with a ZZ 42 igniter covered with a hinged the pin out thus freeing I lb. A modified varsion iter (Ref 4, p.82.04 and e (Bahallanina Will) ch 50 met morear shell I line had been removed.

a deconstor were fitted arge, which was nither weighing 4 on A pull shich might mean either sine 35c. The mine was cause prior to the ex-mise was projected up-lied this mine the "Frus, can in size and shapesteel case and an inner on of TNT or Amatel apnel balls, A central ugh the mine, contained d to its lower part a 45

owder charge for ejecting the inner cantater. Three adially around the inner hort delay element was r case, when the ignites to second delay element ing charge. The resulting container upward into ignized the short delay bes. The delay in these

tubes was sufficient to pennic the mine to time in the air before the detonators in the tubes were set off. The detonators then exploded the main charge and the shrappel balls were dispersed in all directions. The effective range was 200 yards. Various antilifung devices were amployed with this mine (Ref 3; 4,p 82.01

devicés were amployed with this mine (Ref 5: 4, p 82.01 and 6, pp 280-11 smiler in design to 5-thi 37, except 19) 5-thine 4 think the 5-thi 4 the 4 think the 19 think the 5-think the 5-t

(Ret 0, pp 117-001).

Note: According to Ref 5, p 82,01-e there were other modifications of 5-Mine and Ref 3 deacribes 5-Mi 41.

20 Elamine 42 (Flascheneismine) was an A/P Mine in

the form of a wide-mouth bottle, intended for use under ice. The bottle contained 5 lb 10 oz of Gelatine-Donarit tee. The bottle contained ) in 10 or or container-tomaris and was provided with a pall or persaure ignites. The mines were also used as antipersonnel land sinces. For this they were encased in contrete containing shapesed (Ref 6, pp 281-2)

21) Scholleschwirzenmind was an inprovined A/P mine

is the form of a mentard pot and was loaded with powdered Pictic Acid (4 ox). The mine was covered by a pressed swel lid with the Buck ignitor attached by means of an mere no want the Buck ignitor attached by means of an adapter. The detonator was inserted in the center of the like charge. A moderate pressure on the top of the igniture was neft chest to set off the mine (Ref 6, pp. 267-3).

bbreviationa: AF Antipersonnels AT Antibank, HE High Explosive.

1) A.R.Schilling, Pic Aren Tech Rept 1246 (1943) 2) A.B.Schilling, ibid 1377 (1944) (Tellermine Land Mine Type 4)
3) J.P. Wardlaw, ibid, 138 (1944) (Antipersonnel Mines

1) 2 Wardian, 15th, 13th (1944) (Antiperconael. Mines 5.75 and 5-41)

4) Ance, Land Mines and Booby Trape, War Department Field Mean IR 5-31 (1945-1944), pp 81.01-82.06

5) Ance, Mines in the Spotlight, Intelligence Bulletin, 1942-1944, pp 181.01-82.06

5) Ance, Mines in the Spotlight, Intelligence Bulletin, 1942-194, pp 181.01-82.07

6) Alocal Serial TA 5-1985-2 (1953), pp 261-83

Note: The following mines (which are not described in the above References) are listed in the "Enemy War Intelligence Harveston, 1947-195-195-2 (1953), pp 261-83

Note: The following mines (which are not described in the above References) are listed in the "Enemy War Intelligence Harveston, 1947-195-2 (1947-195), pp 261-97

Force: (1947), pp 260-97

Force: (1947), pp 260-97

Force: (1947), pp 260-97

Force: (1948), pp 260-97

Force: (1

Lood Axide. See Bleinxid.

Lund Paraxida. See Blaineraved.

Lund Pictore . See Blaipikrat.

Load Styphnato (Blaitzinitrozenorainut). San Trininat. Looflet Rocket, See Propaginde Rakere,

Loonit (Leonite). Permissible explosive consisting of K perchlorate 35, Am nitrate 10, Na nitrate 3, crude TNT 11, wood flour'7, NG 4 and alkali chloride

Reference: MiGius et al. Dizionario di Chimios. UT-ET, Terino, (1951), p 166.

"Looperd". See Experimental Tanks under Panzer. ".

"Lieneld" or "Ancie Amie". A 280 mm Railroad Cha. Model 5 (28 cm K-5), designed during WV II by Gesoner (See also Gesoner Gus and under Wespons).

Lduchthombe (Illuminating Bomb). See under Bombe. and Flore, .

Lauchtspurantne oder Lichtspursötze. See- Tracer Compositions.

Lover igniter (fiebelaunder)! See Pressure igniter, under

Lipsofel, A highly compressed isminsted wood used for the construction of the fine of some rockets; e.g. the Rheistachen [TM 9-1985-2 (1953), p 227].

Lignone Sprongutoffworke G m b H, Beclin. See under Warplanes and Accepaly.

Liquid Rachet Propullants. See Rocket Propullants, Liquid.

Littfejafen Gem er Seenane Bore Gun. Seellote under Tapered Bore Gen.

LPZ Mine,'A light autitant or entipersonnel land mine, ft is briefly described in TM 9-1985-2 (1953). p 274.

LT (Luw Tonnion) Electric Detennion. See Gaalens Deiny

Luchs (Lynu), See under Panzer.

Lowes (Lyrais, Not sever Penaric.

Lowed Spalledespee (Lugi Cracking Pient) operated during 178 B at the Schlebusch Fabrik, D A C. It repassessed 50 (and laterSO<sub>2</sub>) from laters from sulfuring card contaminented with organic materials and inspended solida.

The procedure was ensured the sulfuring card contaminated was volatilized in the Company and the Company of the Company of

Reference: F. Heppensmil et al. : BIOS Final. Report 1634

Lovicion. Trade some of Polyvinylenithmale. According to CIOS Rept 21-3 (1945), p.5 this plantic was unset infectory for injection molding nance it had a Melting point of over 200 C.

Lyon, See Luche, under Pauxer.

M/71 Hornol-Pulver Black powder used by Garman infantry previous to the invention of smokeless propellent [ Daniel (1902), p 414 ] . 1000

# 88/91, # 91/94 Pylvor Smokeless propelliente manplaceured at the and of the last century by the Vereinigre Kota-Rottweiler Pulverfabriken at Rattweil. Wiltenburg [See Duniel, Dictionnals(1902), p 414].

Machian Con (Maschinengewehr). See under Wenponn.

Muchina Gen, MG, 42 (Muschinengewehr 42) in a7.92 mm weapon developed in 1942 and which served during W. If on the basic weapon of the infantry squad. All its parts were monufactured by stamping. It could

dice up to 1,200 rounds per minute. For a more detailed description sees M.M. Johnson, Jr., Army Ordnance 30, 352-58 (1946) and G.M.Chinn, The Machine Gun, U.S. Navy. Bureau of Ordnance, Washington, D.C. v 1 (1951), p 484.

Made-us-Chures. According to the description given in PB Rept 925 (1945), p 18, the Germans draigned the following averem of propellent loading incended to replace the bag loading in large caliber guns:

A Targe cylindrical casing, 18" diameter and 6 ft; long, made of sheet smokeless propellant 3/16" thick, was closed at each end with a disc of the same material. Euch disc had a hole, 3" diameter, shrough which was inserted a long pipe which was made of smokeless propellant, and 'perforated with sumerous holes 1/2" diameter. The space between this inner tube and the walls of the cylinder was filled with utains of a propellant of desired shape, size and calorific value. The inner perforated tube served to convey the flush from the igniter charge to the it was claimed that the propellest charge of the

se-called "Seventopol" Gun" was made on the above principle. "Madrid" Infrared Haming Device. See under Guidance

Manustium Oxide (MgO), described in the general section, was included as a component of many German solventiess extruded propellants, it was claimed that MgO' greatly facilitated the extrusion process. The composition of some propellants conts 0.05 to 0.25% Ma in given in PB Rept 925 (1945), p #5-91, (See also under Propellanta). . .

Megnetic-Ballistic Guidence System for Miselles. See under Guidence Systems for Missiles.

Magnuskraft (Magnus Effect). See general section and also books on Ballistics.

Monnal Trade name for Ethylaceravilide described in the seneral sections, Its 20% alcoholic sola in a good gelatinizer at 55° or higher temperatures for collection

Referencer Kant-Metn, Chemische Untermehung (1944), p 160 ....

Munoverpolver (Maneuver or Blank Fire Propellant). The following compositions are given in Branswig, 286 cauchione Pulver, (1926), 3, 136; a) guncotton. 17, diphenylamine 1.0, moisture 1,0 and relatinizer . 4%, b) gancotton 67, NG. 32, moisture 0.5 and gelatitibet

MAN-Salu (Man-Salt) Described abidethylemine Hittate manager (Mas-Satth Described an Methylamine Mittate in the game of method for German technical anit and a p ca 103 white the puri d watering was 109110.

Ohe of the Garman methods for preparation of 4 . N-Salz was as follows: Nethylamine (97-98-5% purity) and west to hairal).

nitric acid (45 to 66%) were mixed charge maly

at the rates of 1240 and how part by actain par hour sespectively. The

1 mile

about 700 so that the heat of neutralization could be utilized at the same time for the vacuum concentration of the salt in order to avoid using too much ateam. The resulting solution of methylamine pitrate in acidic water was concentrated at about 50° to about 85% attength. The concentrated squeous liquor, which had a pH of 6.5 to 7 was cooled to 200 with water while being stirred, and the first crop of crystals collected (about 40% of the total salt). Then the solution was cooled to -10 to recover another 40% of the product. A centrifuge was used to remove the crystais. The mother liquor (about #8 87% solution of MAN-Saiz) was used to wash both batches of crystals in the centrifuge; a total of about 10% by weight of the centrifuge charge was used for a washing. Three washings were made: About 2/4 of the final mother liquor was returned to the evaporation cycle, the other 1/3 to the salt regeneration and purification. Final drying was done in stoves or by blowing hot gas through the malten salt; pH control was necessary for econom-

According to Compan sources, the heat of explosion of MAN-Salz is 1200 kcal/kg vs 1000 for TNT, the volume of sases produced at NTP (0° and 760 mm Hg) 834 1/kg vs 780 for TNT and the velocity of detonation 6600 m/sec ve 6200 for TNT, at a density not indicated The salt is practically insensitive to shock and mable even when held at temperatures ranging up to 150° In order to insure the maximum detonation rate of MAN-Salz, it is advisable to mix it with a small amount (as low as 5%) of RDX (or PETN), MAN-Salz is hygroscopic, but the hygroscopicity is reduced on the addition of Na nitrate or other substances. A mixture of MAN-Salz with Am nitrate and 15% RDX has a heat-of explosion of 1120-1260 kcal/kg.volume of games 740 1/kg and velocity of deconation 6700 m/sec It is insensitive to shock and can be cast-loaded (Ref 3).

ical recovery (Ref 1, p 22).

User: Due to the high mp of MAN-Salz, it was considered usease to 'tase'-load it into shells or bomba. This difficulty was overcome, by incorporating some Am nitrate, as for instance: MAN-Salz 25 to 30, Tri-Salz 1 to 3 and Am nitrate 67 to 74%. This mixture called Form's noftened and exuded as 60-70° and was considered not very suitable for use in shella. However, suitable mp a were obtained when ammonium bitrate was replaced by Ma nitrate, as in the following mixture: MAN-Salz 28 parts. Na nitrate 42 and RDX 13, (Ref 3). This explosive composition was practically oxygen balanced and proved to muitable must back or bullet impact, but it detomated when his by a bomb 8c shell. A similar mixture was know as C6 (see Ref 2).

In order to eliminate the danger of detonation of projectiles [Filled with MAN-Salz I in the course of shipping them to the front, it was proposed to incorporate 10-15% of water in the MAN-Salz. This amount of water was sufficient to render the MAN-Salz insensitive to shock or to sympathetic defonation, to was only necessary to add to the contents of pretties (before uses) some highly concentrated spire soliteties.

and about 15% of a highly dispersed inorganic agent, such as silica or alumina. Io order to prevent corrosion from the situte acid the inside of the projectile was coated with acid-proof paint, such as a hydrocarbon-type high polymer.

MAN-Saiz was also used in mining explosives, where it was usually mixed with Na nitrate (the cuercite melts below 50°) and a small amount of hydrated search or other gel. (to render the mixture plaste). Small quantities of RDX or PETN could be incorporated when it was desired to increase the velocity of deconation of the explosive.

1) O.Stickland et al, General Summary of Explosive Plants, PB Rept 925 (1945), p 22

2) G.Römer, Report on Explosives, PBL Rept 85,160 (1946), p 25

3) H.Walter et al, German Development in High Explosives, PB Rept 78.271 (1947), pp 4-7.

MAM-Solz Perchlores (Man-Solz Perchlores), Methyliammonium prechlores) was peped by Water et al by enumerium genomonethylamine with perchloric acid. As this explosive had a high mp and was highly sensitive to shock, it was necessary to use it in matoures with substances which would lower its sensitivity in well as its mp. The low mp was desirable in order to be able to cast-load the explosive. Such mixtures could be obtained by boiling under treflux, a solution of Am perchlorese in commercial queous formalabhyde. After distilling off the water and other volatiles, a solid explosive, mp 90-100°, was obtained. It was compacible with RDX. As it was inferior to MAN-Salz, no further investigation, was made [ Water, PB Rept 78, 277 (1947), p. 7 B Rept 78, 277 (1947), p. 7 Begt 78, 277 (1947), p. 7 B

Montelpetrone (Sheathed Cartridge). A short description of sheathed explosives is given in the general section. During WP. If, the Germann used "active sheaths" (q v ) for housing explosives such as Wetter-Wasagit A. See also References under Active Sheath).

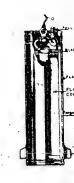
Merobu. One of the proximity fuses developed during WW II in Germany. The device is mentioned on p 229 of TM 9-1985-2

Marder (Marica) (Called by the French "sopille humaine"). A device developed in 1944 consisting of a toped on the second of the

[ A.Ducrocq, Les Atmes Secrètes Allemandes, Bèrger-Levenult, Paris (1947), pp 33-34 ].

Murder II. A self-propelled mount (also called tank destroyer) consisting of the 75 mm A/T Gus or of the 150 mm Hesty Infantry Gus on Pakpfw II tank (See also under Panzer).

Marder 38. A self-propelled gun mount utilizing one of the varieties of Czech tank T-38 (See under Panzer).





utralization could the vacuum cono avoid netus too on of methylamine centrated at about The concentrated 1 01 6.5 to 7 was ile being stirred, collected (about the solution was other 40% of the ed to semove the out sa 87% solution h both patches of oral of about 10% aree was used for were made. About es returned to the 1/3 to the sait Final drying was ot gas through the

heat of explosion 000 for TNT, the and 760 mm Ha) ocity of deconation naity not indicated sapck and stable nging up to 150°. detonation tate of x it with a small PETN). MAN-Sels picity is reduced other substances. tate and 15% RDX 60 kcal/kg, valume tonetion 6700 m/sec n be cast-loaded

exact for accesses

-Salz, it was comshells or bombaaccopporating-some N-Salz 15 to 30, 745x. This mirrours of at 60-70 and for use in shells. ed when ammonium as in the following 42 and RDX 15, on was practically sutrable for use in arle against shock hen hit by a bomb was as C6 (see Ref

of detonation of in the course of a proposed to una proposed to una MAN-Salz. This ader the MAN-Salz athetic defonation.

HITHER TO INITIATION, e contente of procentrated nigro acid necessity.

and about 15% of a highly diapersed inorganic agent, such as alica or alumins. In order to prevent corrosion from the nitric acid the inside of the projectic was coased with acid-proof paint, such as, a hydrocabon-type hist polymer.

MANSalz was also used in mining explosives, where it was usually mixed with Na nutrace (the autectic meltabelow 50°) and a small amount of hydrated starch or other gel. (to render the mixture plants). Small quantities of RDN or PETN could be incorporated when it was desired to increase the velocity of detonation of the explosive. Resirences:

Nejargocus:
1) O.Stickland et al, General Summary of Explosive Plants,
PB Rept 925 (1943), p 22

2) G.Romer, Report on Explosives, PBL Rept 85,160 (1946), p 25

3) H. Walter et al, German Development in High Explosives, PB Rept 78,271 (1947), pp 4-7.

MAM-Soll Perchlorete (Man-Salt Perchlorete, Methyltaumonium Perchlorete) was pyged by Maiter et al by neutralizing mononethylamine with perchloric acid. As this 'explosive and a bigh mp and was highly sensitive to shock, it was necessary to use it in mixtures with substances which would lower that sensitivity as well as its mp. The low mp was desirable in order to be able to case-load the replicaive. Such mixtures could be obtained by boiling under treflux, a solution of Am perchlorate in commercial we aqueous formaleshyde. After distrilling of the water and other volatiles, a solid explosive, mp 90-100°, was postained, by twas compassible with RDX. As it was inferior to MAN-Salz, no further investigation, was made [Walter, PS Rept.78, 277 (1947b, p. 7)

Momesperone (Sheathed Carridge). A short description of sheathed explosives is given in the general section. During WW'II, the Germans mard "active sheaths" (q v) for housing explosives such as Wetter-Wassgit A. (See also References under Active Sheath).

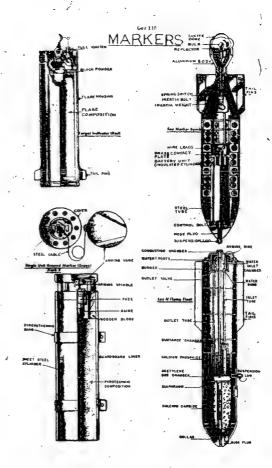
Merebu. One of the proximity fuses developed during TW II in Germany. The device is mentioned on p 229 of TM 9-1985-2 (1953).

Marden (Mairca) (Called by the French \*torpille humaine\*) A device developed in 1944 consisting of a torped on the available of the seventh o

(A.Ducrocq, Les Armes Secrètes Allemandes, Berger-Levrault, Paris (1947), pp 33-34 ...

Marder II. A self-propelled mount (also called tank deartoyer) consisting of the 75 mm A/T Gus or of the 150 mm Heavy intautry Gus on Prkpfw II tank (See also under Paszer).

Morder 38. A self-propelled gua mount utilizing one of the varieties of Czech tank T-38 (See under Panzer).



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Marine Explosives of WW 7 and WW II. Under this title A.Stettbacher, in Protar (Switzerland) 9, 33-45 (1945). describes the explosives used by the Germans for filling torpedoes, ses mines, depth charges etc:

al Emplosive of WW I: TNT 60, HNDPhA (heisanitrodiphenylamine) 40%

b) Explosive of WW. II: TNT 61.8, HNDPhA 23 and Al powder 15.3%

The second mixture was much more effective than the first one.

Révises Geschért Pulven Black poyeder und as hunter is photofinsh bombs, such as Street Posses. The consense of the property of the property of the property of the hances 1,5%. The granulation wise 0,68 to 1,3 mm and the molatuhe content 1,5%. Réferènce: The 9-199-2 (1953), p. 82.

Merk 50 Keshede (Cascade Flare Bomb). See under Pyrotechnic Anti-Pathfinder Devices,

Merker (Anzerger). A pyrozechnic device used to mark a position. Most of the German markers consisted of cylindrical gardboard containers filled with a colored flare composition garmoned containers tilled with a colored time composition which was ignited by an impact, type fuse. Some markets merely contained a brightly colored powder, which was dropped into the sea from low elitimdes to mark positions. Others were modified paracture flares of various colored in the colored powder.

- The following natural described to TM 2-1292-2 (1293)...

could be classified as markers;

1) NC 50 WC NC D/SEE, Smoke Marker Bomb resembled
as ordinary HE bomb, it consisted of so, aluminum puter casing (empty except for metal ribs and braces) tail, cone, some and central cylinder which protested from the some and extended aft to the forward part of the tail where it was perminated by a fuse housing crimped to it. Waterproofing at the tail was provided by a rubber seal. The central cylinder contained the smoke producing agent. Four fins and a place (called drogue) west arrached to the tail end. Impact of the bomb on water caused the drogue, together with the fuxe release red, to be wrenched off. This action fired the fuxe and imited the amoke mixture. At this time the bomb would be floating on the surface. Eventually the heat; from the burning amoke composition destroyed the rubber seel and the moke was vented to the outside, thus indicating the position of the marker (pp 58-9)

2) Mark S Fince, Types I and 2, Floating devices which could serve as markets of for signalling purposes (See mader Flare and in TM 9-1987-2, pp 7-9).

3) Target Indicator (Red) consisted of an aluminum cylindrical casing housing a flare composition anclosed in a cardboard cylinder. The suspension plate at the held an eye to take the parachute shackle, and pall igniter which was connected by \$ 4% inch length of safety fuse to a small bag cones black powder. This served both to set off the igniter pellet in the the candle and to eject the latter from the castn. when it fell freely to earth and acted as a ground marker. The pull igniter was attached to the loop of the shroad lines by a cord and the opening of the parachute gave the necessary pull for operating the inniter. There, were (for some unknown purpose) two small line at the nose end of the container (pp 84-5) 4) Ses Marker Bomb consisted of sheet steel, bomb-shaped container, supported internally by a series of annulat attengthening bulkbends. The tail and of the somb was provided with four stabilizing time and in extension bousing a lame unit covered with a lucite dome. A battery of six dry cells was boused in the center of the bomb. As the momens of the release of the bomb from the aircraft, the inertin bolt was positioned between the plates of the spring switch in such a manner that one-side of the circuit between the lamp and the batteries was broken. On impact of the bomb, the meetin bole was forced out of position and the circuit between the lamp and battery was completed. As the batteries filled only a portion of the bomb body and as all joints" ver. made tight by tubber washers, the marker floated on the surface of water. It is assumed that the

marker provided a recognition or bearing point for

aircraft.(pp 85-6) 5) Sea Marker LUX EZ 50 SC was constructed of sheet steel in two parts (nose and tail) loosely joined together about 1/3-the distance from the nose. Its external view and a brief deacription are given on p 87 of TM

9-1985-2 (1953) 6) Mark 3 Grun (Single Unit Ground Marker, Green) consisted of a sheet steel cylinder enclosing a cardcussisten os a somet signi cylingue; enclosing: a card-hoard consisten with the pyrotections composition, a fuze with gaine (filled with black powder), an arming-spindle and an aming vane, which was loosely fisted, within the housing. On release of the marker from the aircraft, the current of air rushed through? the was: holes in the arming yone, thus ejecting it from the housing. By reason of its shape, the aming wase totated as the missile was fallings. This courses unscrewed the aiming spindle of the furnishes permitting its clockwork mechanism to function. At the expitation of predetermined delay, the black powder in the raine became ignited. The Tenulting flash ignited the pyrotechnic composition and at the same time a slight explosion took place which ejected the cover cop, suze and arming want housing. The pyrotechnic filling burned for about 314 minutes -

2) Luz N Flame Float. A bomb-like device constructed of affect steel and provided with four fins. When released over water the device went undetache surface thus allowing the water to enter the ports and to pass down the injet tube into the calcium phosphide chambers. The resulting reaction produced phosphine gas which to the burner where it ignited spoutaneously to form a pilor jet. At the same time, water entered through the channels in the nose and passed through a perforsted tube into the calcium cathide compartment. The acetylene evolved passed through the perforated disphragm into one compression chamber and thence to the burner where it was-ignited, by the pilot jet (pp 91-2) 8) Lux S Flame Float (Types 1, 2 and 3) was cylindrical

in shape and contained, as in the previous device, Ca phosphide and Ca carbide (pp 92-3).

Marspille or Mars Priming Drops. Low tension fuseheads intended for ordinary instantaneous detonators. They were manufactured by dipping the tip of the electric bridge wire into the following liquids:

a) Lat dip composition consisted of 100 g of dry Ph bicrate suspended in 50 ml of a 2% solution of NC in amed or buty scetate. After the drop on the tip became, dry it was dipped into

b) 2nd dip composition consisting of Pb picrate 40 a. Kiperchlorate 35 g and alderwood charcoal 25 a. sunperided in 50 ml of a 2% solution of NC in amyl or bury!

c) 3rd dip composition contained & perchlorate 85.7 and alderwood charcost-14.3 g, suspended in about 50 ml of a 3% solution of NC in amyl or buyl acetate d) 4th dip composition was a lacquer consisting of a 15% solution of NC in 75/25 butyl acetate ethanol to which was added (20% of the dry weight of NC) Sipolin AOM. and 17 g of Sudan Brown for each 10 I of liquid Notes: A) For meterial to be used in tropical countries, the 4th did contained Al powder (200 g per liter of

lacquery, which was supposed to protect the fusehead aminur static electricity B) Mars Tile powersand the property of not igniting

which was a great advantage. C) The soldering of the budge wire to lend-in wires, the preparation of dry ingredients, for fusehead dips, the preparation of NC varn; shes and the process of dipping the fuschesds are Cescribed under Faschend Manufacture.

1) BIOS Final Rept No 833, Jtem 2(1946), p A3/36

2) PB Rept No 95,613 (1947), Section D.

Manahinanaewehr (Machine Gun) See under Wenpons.

"Meus" | Mouse!. A heavy mak designed by Potsche (See Experimental Tanks, under Panzer)

Mogenie [Megunite]. One of the WW I straight dynamites: NG 00.0; Rugated wood pulp 10.0 nitrated every nut meal (corozo) 10.0 and Na nitrata 20.0% [P.Nadam,Nitroglycein, Baltimore (1928), p 284 1. ii

Mobilgulver (Meal Powder) Affinely pulverized black powder uned in pyrotechnic compositions, its preparation is de-cribed by A. Seetbacher, Schries- und Sprengstoffe; Leipzig (1933), p 103 (See also Meal Powder in the general section).

Molen. A jelly originally mepared by Sprengabite A -G Chrhosit, Schleback, by-belling syrcrin with an aqueous colution of jule. It was decorporated in pose dynamics in order to increase their planticity. Some spreamptus mixtures contained desuit flee aim Gelatine-Carbontl and Safety Telly Dynamite).

Salety Jelly Dynamite), Reference: P.Naoum, Nitroglycerin, Baltimore (1928). D 406.

Moldstücken (Message Container or Message Tube). A device for dropping messages. Two types of containers used for this purpose are described in TM 9-1985-2 (1953).

a) See Massage Tube consisted of an aluminum cylinder in which the upper compartment contained a smoke m. which the upper comparament Tontained a smoke composition, whereas the lower (satisfy) comparament carried a sessange. On dropping the missile from at place, the friction insite was pulled and the resulting blank lighted the delay base, which in cure ignited the battom partot the smalle composition. Here between the battom partot the smalle composition when here we will be smalled to the smalled the battom partot in the small place to compare the smalled the small place to compare the smaller than the small of the small place to compare the small proper to compare the small proper

approached the sizelle and removed the measure charaner by openity the cap (at the regs of the tube) and pulling the chain (b 120).

It is the chain (b 120) of the control of the chain (b 120) of th (m. 121)

Margarie Palminute . See Knallquecknilber.

Messege Pistel Grenede (Nachrichten Pistelengranate).

Massage Tube. See Meldebücker

Mannel (Mensuring Eng), A device designed ht the Krupp plant for measuring the pressure developed in gens. The extent to which a copper cylinder was compressed by the games of combustion of a propellant served as a measure of the maximum pressure developed in chamber. For more information on this subject, see H. Breanwig. Das rauchlose Pulver, Berlin (1926), p 412.

Motocelludel . Trade name for m-Telumbeulfamide, H C.C.H. SO NH , white trystals, mp 107. Its solution in acces organic media was claimed to be a good gelatinizer. for NC.

Referencer Kant-Mern, Cheminche Unterpuchung, Benun-nchweig (1964), p 162,

the general vection aming was hever us of its nitrose, calle Mathylanina Hitrate

declarates. Ica pe

described in the g during VV II as a' it was found to be nines for NC. Pelerence: PB Rei itle 43),

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autraft(pp 85-6);
5) Sea Marker LUX EZ 50 SC was constructed of sheet 5) Sea Marker LUX EZ 50 SC was constructed of sheet steet in two parts (none and tail) loogely inited together about V3the distance from the none. Its paternal view and a brief description are given on p 37 of TM.

9-1987-2 (1953).

(5) Mark 3 Grain (Single Unit Ground Marker, Green)

consisted of a sheet steel cytinder enclosing a caddconsisted of a sheet steel cytinder enclosing a cadd
those with gaine (filled with back powers), as amma, a

spinide and an amming vane, which was loosely fixed whin the housing. On release of the maker from the

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notating by reason to us analyse, one among water totated as the missale was relained. This totation was revered the among spindle of the first flux plottering the receivant of predetermined to the client. As the explanation of predetermined to the client to the composition of the client to the professional composition and as the same time a slight explosion, took place which ejected the cover cap, suse and among frame housing. The pyrosechaic filling barned for about 3½ minutes.

2. Lus N Flame Float. A bomb-like device constructed

of wheat seed and provided with four fins. When released over water the device went undexactle surface that allowing the water to enter the obta and to pass down the surface that allowing the water to enter the obta and to pass down the surface that the surface thad the surface that the surface that the surface that the surface

B) Lux S Flame Float (Types 1, 2 and 3) was cylindrical
in shape and contained, as in the previous device, Ca
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Muspille or Mors Priming Drops. Low tension fuscheads intended for ordinary instantaneous deconstors. They were manufactured by dipping the up of the electric bridge wire into the following liquids:

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Lipsycontorate 35 g and siderwood charcoal 25 g, augmention of NC in amyl or buryl mage date.

"Tyd dip composition contained K perchlorate 83,7 and siderwood charges 14,3 g, suspended in about 30 ml of a 3" solution of NC in amplior buryl acetate dy-4th dip composition was a lacquer consisting of a 13" solution of NC in 3"3",5 buryl accetace channol to which was soded (20% of the Jry weight of NC) Sippoin AOM inchical in the metalyticolnexial ester of adopte acid. Two 1" g of Sudan Brown for each 10 1 of liquid. Notes: A) For materia. In one used in topoccal countries.

the 4th dip contained Ai powder (200 g per licerof inequer), which was supposed to protect the fuse-read against scatic electricity.

it) Marshille possessed the property of not igniting friedemp, which was a great advantage

C) The soldering of the bridge, were to lead-in wires, the preparation of dry ingredients for fugahead Jips, the preparation of NC same sheet and the process of dipping the lastnesds are described under fuserness Manufacture. 1) BIOS Final Rept No 833, Item 2(1946), p A3/36 2) PB Rept No 95,613 (1947), Section D.

Manchinengewehr (Muchine Gun) See under Wespons.

"Move" i Mouse!. A heavy mark designed by Porsche (See Experimental Tanks, under Panzer)

Monanti (Meganite) One of the Wh I straight dynamics. NG 60.0, Brusted wood pulp 10.0, nitrated ivory nut neal (coron) 10.0 and Na nitrate 20.0% [P.Nabum,Nitroglycetin, Baltimore (1928), p 284.

Mehipulver (heal Powder). Afterly pulvenzed black powder used in pyrotechnic compositions. Its preparation is deribed by A.Stecthacher, Schriss- und Sprengstoffer, 'Leipzig (1933), p 103 (See also Meal, Powder in, the general section).

Matim. A jetly originally depared by Sprengarolfe A-Carbonit, Schlebauch, by allog glycerin with an aqueous solution of glore, it was incorporated in 30me dynamics in order to increase theisighlasticity, Some glycerington wintsures contained dethin (See also Gelatine-Carbonit and Safary Jetly Dynamics).

Reference: P. Naoum, Nitroglycerin, Baltimere (1928), p 406.

Meldebuchee (Message Container or Message Tube), A device for dropping messages. Two types of containers med for this purpose are described in TM 9-1985-2 (1953), pp 120-1:

a) See Meanage Tube consusted of an alumnum cylinder in which the upper compartment consumed a smole composition, whereas the lower (arright) comparement and place, the friction ignires, was pulled and the resulting bottom part of the smoke composition, when persons for whom the meanage was intended, saw the smoke, they approached the misalle and removed the meanage was presented the misalle and removed the meanage was intended, saw the smoke, they approached the misalle and removed the meanage compared to the cube and pulling the chair (o 120).

b) Lead Message Tube was also cylindrical in shape and consisted of two copporationats. The smoke Componition in the upper compartment was ignited by means asked of the smoke reconsistent and net stevenal pieces of quickmatch below the zimoke container. The attends were ignited when the first coin signific was pulled on dropping the mastife from a place. The message was (or 121).

Mercurie Fulminote . See Knallqueckeilber.

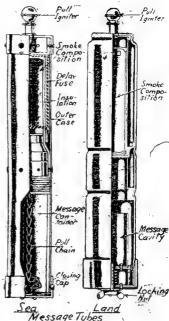
Neasuga Platel Grenade (Nachrichten Pigtolengranate).

Mansage Tube. See Meldebüchse

Meaned (Meanuring, Egg.). A device designed at the Knipp plant for neasuring the pressure developed in guas. The extent to which a copper cylinder was compressed by the gases of combustion of a propellant served as a measure of the maximum pressure developed in chamber. For more information on this subject, see H.Brunswig, Dan rauchlose Pulver, Bettil (1956), p. 412.

Meracelludol Frade name for m-Toluneasuffemide, H<sub>2</sub>C.C.<sub>6</sub>H<sub>A</sub>SO<sub>2</sub>NH<sub>Z</sub>, white crystals, no p. 107°. Its solution in some organic media was claimed to be a good gelatinizer for MC.

Reference: Kant-Herz, Chemische Untersuchung, Braunschweig (1944), p 162.



Methylomine. Ice preparation and properties are given in the general section. According to Dr. H. Walter, methylamias was never used in Germany per se but in the form of ice mirrate, called Man-salz (27).

Methylumine Nitrate See Man-Salz.

Mathylnitroproponedlal Dinitrate,

described in the general acction, was examined in Germany during WW II as a possible substitute for NG in propellants. It was found to be fairly stable but not a very good gelatinizes for NG.

Peference: PB Rept 925 (1945), p 15.

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Spigelman

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PICATINNY ARSENAL TECHNICAL REPORT NO. 2510

## DICTIONARY OF EXPLOSIVES, AMMUNITION AND WEAPONS

(GERMAN SECTION)

BASIL T. FÉDOROFF

HENRY A. AARONSON GEORGE D. CLIFT EARL F. REESE

DOVER, NEW JERSEY

Methylsteff. A mixture of aluminum dichloromethyl, AlCi\_CH\_1, and aluminum chlorodimethyl, AlCi(CH\_1), proposed as a substitute for phosphorus in incendiary aitions. The mixture was prepared by passing methy chloride vapor through copper-iree aluminum turnings.
Réference: R.E.Richardson et al. CIOS 25-18 (1945).

Matrialtrinitres (Metric) Trinitrate), (Methyltrimethylolmethene Trinitrate or Pentaglycorin Trinitrate), H.C.C. (CH\_ONO\_), described in the general section, was developed in Italy before WW II by Bombrini Parodi-Delfino

and adopted large by the Germans.

The following method of preparation was used at the Krimmel Fabrih of D A -G : .

a) 50 kg of finely pulverized and nieved Metriol was slowly led with stirring by neans of a worm screw, ince a expinious steel nitrator containing 175 kg of mixed scid, (65% HNO and 55% HSO.) maintained at 20 . Formation of lumps and to be avoided because

this could lead to overheating und decomposition of metrial and acid

b) After 20 minutes of nigration, 15 minutes were allowed for apparation of the oil from the acid

c) The separated oil was washed, first with water. then with sods ash sols and finally with water. The temperature during all the washings was maintained at 40° because at a low temp the mirrore was too viscous. The sods ash wash lasted for 20 minutes.

The wield was 200 parts MtrT per 100 p of Mr. d) The washed oil was taken to a storage, tank from

which it was withdrawn when needed for the porneration of "Rohpulvermased (Rawpaste) (q v ). German technical MarTwas a beavy oil, practically insell

in water, with the following properties: No.16.00% to 16.32%, d 1.460 at 20°, stability by Abel test at 82° 20 mins, decomposition temperature ca 1.82°, impact sensitivity with a 2 kg hammer 4 cm- culorific value 1270 kcal/kg (water in limid phase), volatility less than NG.

It was used in some amokeless propellesce as an enplacine planticines for NC in lies of NG.

Reference: PB Rept 925 (1945), pp 15 & 61.

Michalankit (Michainskies). A type of chlomas explosives manufactured in Germany and Poland before WW II: a) E or - Na chlorare 88-91 and liquid, hydrocarbons (with flush point not below 30°C) 12-9% (Ref 1); b) K chlorate 90 and petroleum 10%, the first mixture belonged to the group of Chloratites 3.

Referènces

1) P.Naoun, Shiess- und Sprengstoffe (1927), p 131 2) A.Steubacher, Spreng- und Schiesstoffe (1948), p 91.

Mikroversügerung beim Sprengen (Microdelay in Blasting) is described by Z.Peithner, Explosivatoffe 1934, Hefe 5/6, ap 68-70.

#### Mine, Land. See Landminen;

Minenhund/Mine Dog), called by the Allies "Doodlebug" or "Goliath", was a miniature two-track tank operated by remote control through a 550 vd 1 atrand cable which uswound from a drum on the tankerte. Separate electric motors. each powered by its own storage battery, drove the two each powered by its own storage battery, grove the two tracks of the twok at a speed up to 4 sph, Steering was done by braking the tracks. The tank countined about 250 kg HE demolition charge which the remote-control operator was supposed to touch off after stopping the vehicle at its target.

These mobile mines were not very effective because they could not more in severae. On account of their low speed and thin amour, they were easily destroyed by the Alites' artillery.

Reference: Anon, Field Artillery Journal 34 505 (1944). Ministers Terradoes. See Explosive Powered Various.

Mining Effect. See Earth-Displacement Test. . . .

Mining Explosives. See Compercial Explosives.

Miselam and Miselam Seeling Pluga. Mipolame are plantic compositions developed in Germany during WW II and used in the prepa of scale for some delay detonations. Previous to WV If frad seals were used. The Minolan sealing place were made in three types:

a) Long greyish-green plug with a single hole

b) Short grayish-green plug with two holes. The Mipolam was composed of polyvinyl chlorids 50, tricresyl phosphase 30 and reicum 20%

c)-Shore reddish plug with two boles, The Mipulum was compound of polyvinyl chloride 51. Special Mixture 51. and talcum 1876 as Note: The Special Mixture consisted of 2 parts microsyl

phosphare 2 pre Palatinol HC and 2 pre Palatinol K. The composition of Palatinol HC was not given, and the Palatinol K was butylene glycolobthalace.

Mipolam was also used for covering the land-in wires of electric deconators. The thickness of coating for 60 cm wires was only 0.25 mm on deconstors not intended for underwater operations and 0.35 mm on those intended for such operations.

1) W. Krannich, Kunststoffe im technischen Kotrosionsschutz, Lehmana, Serlin (1943), p 25

2) BIOS Rept (Final), No 833, Item No 2, Lordon (1946) or PB Repr No 63,677 (1946)

3) PB Rept No 95,613 (1947), Sections H, [ and ].

Note: According to Mr. F. Fogler et al, ClOS Rept 21-5 (1943), p 5 there were three types of Mipolam: a) Plasticized poly-binyl chloride b) Capolymens of polyvinyl chloride and acrylic esters and c) Polyvinyl chloride, and ambleic esters

Mischmetall (Mixed Metal) was an alloy of rare earths of the following approx compa: Ce 49.0, La 25.6, No 16.0, Pr 4.6. Sm 2.0.-Tt 1.0. Y 1.0. and Fe 0.8%. It was used an a component of delay elements for electric blanting cape. Other ingredients of delay elements included: Mg. Al, Ni and Zn homogeneously mixed with a fuel such as Si and an oxidixing agent such as Pb O.

Reference: :-H.M. Kerr. C.R. Hall, U.S.P. 2,560,452 (1951)/ C.A. 44. 1259 (1952).

Mischaets (Mixed Charge). Designation for a mixture of lead axide and lead syphoses for use in deconstors, (See also Sprengkapsel A und Sprengkapsel B).

References W.Schneider, Sprengechnik, 4952, No 10/11, p 186.

Mittel AEP (Agent AEP). Trade name for Ethyl Ester of p-Tolumosulfenic Acid, H\_CCH\_SOSCHg; white crystals mp 31-32° its solution in organic media was claimed to be a good gelatinizer for MC. Reference:

Kast-Mors, Chemische Untermechung, Braunschweig (1944),

Minul KP (Agent KP). Trade name for Creayl Ester of p-Toluenesulfenic Acid, H. C.C. H. SO OC H. Cit, brown oil

d 1.207 at 15°, its soin in organic media was claimed to be a good gelaunizer for NC. Reference: Kast-Netz, Chemische Untersuchung, (1944) p 161.

Mollie t. Guenna trade name for Centralir I.

Mailie II. German trude name for Centralit IL.

Moneichit (Monachite), According to Marshall (Ref 1) monachitre were Favier type explosives. According to Colver (Ref 2) these explosives were invented by Kasi in Germany, Table 26 gives the composition of some monschites.

Designation	`Am sistesse	K sad/or Na uitrass	TNX	Colled	Flour	Char-	Alkati chloride	
Monachit II b	81 64	3	13 14 17	i-	7		17 [9]	
TOTAL DIV		سنسا			_	٠	لننسا	

#### Abbreviacion: TNX Triniprosvicue

According to Stettbacher (Ref. 3), Monachit was an explosive suimble for loading projectives and is was prepared by mining ammonium citrare with the solid and liquid produces of attraction of solvent alpeha.

(See also Filler No 57, under Fillers).

1) Maraball v 1 (1917), p 392

2) Colver (1918), pp 238 & 634 5) Stettbacher, Schiess- und Speengstoffe (1935), p 278 .

Munabal , See general section.

Merter Mifreet). See nader Wespons. Herrer Bomb. See under Bombe.

Morter Shell. See under Grenate and under Spigot Morter Periocelle-

\*\*BP-14 (Solid Catalyst) used for decomposing the T-Sorid (bydrogen peroxide) of liquid sochet propellanta.
Bloken poccelais pieces, praviously sonbed in a 50% alm of 2-Stoli (q v) and dired at 10° for 24 hours, were cooked for 10° minutes in a 50% sols of 2 parts Capego man ganner and 1 part & chromate and there received, 1.10° for 24 hours.

When generating steam from T-Stoff, copper coils were mixed with MP-14 in order to accelerate initial decomposition. The satio of catalyst to copper was about 2 to 1. Reference: CIUS Rept 30-115 (1945), p 11.

M-Stelf Commercial methyl sicohol, sp gg 0.796, used as a component of some liquid rocket fuels, such as C-Stoff (CIOS 30-175, p 10). "Multipede". Same as Hochdruck Pumpe (High-Pressure

busition . Ser Amounttion.

Moutard Pat Mine. See under Landminen.

Murrie Charging Device, used for finer adjustment of the tange of some electrical time fuzes, consisted of a cylinder which fitted around the barrel of a gun just behind the myszle and was connected by means of an electrical cable to a battery and a voltage-control mechanism located at the breech end of the gun, A charging ring, located in front of the muxue, was held by means of three arms placed 120° spars. These arms also served for conducting the electric current from the cylinder to the ring. When a pro-jectile equipped with an electrical time flute, such as the Type 5/30 (ElZaZ 5/30), reached the muzzle, the "feeler

its storage an electri range "Iron es a' eur 00 valu 1 No vers be adimen References L) Anco, (1953), pp 2) H. Bull

Mussle Fi duction in Myrol (Myr of methyl Myrol was a The mater methanol i and be impue

and aback. continuous merhand a more stabl descripcios pp 9-10. f more pores other high combarable mobile liq insoluble i

lossau ical scrioe in methano directly to that is ne of the mo mixture co methasol. 1 Myzole

eave hater Note: Rom 135 methy ià H.O metanical.

Lailowi mistures: to 7500-62

dichloromethyl," nethyl, AICI(CH,) d by passing methyl. aluminum tuminas. CIOS 25-18 (1945).

(Methyltrimethylol-Trinitrate), H.C.C d section, was de-

brini' Parodi-Delfino on was used at the

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H SO ) maintained be avoided because ed decomposition of pinetes were allowed

d. first with water. -

lly with water. The age was maintained the mixturb was 500 red for 20 minutes. n of the

a storage, tank from d for the prepareties oil, peactically imed. No.15.00% to 16.32%,

ene ut UJ 20 mins, pact nonnitivity with 1270 keni/ks (waser

coordinate as:as en-

chlorate explosives eriore WW II: a) K as carbons (with flash b) K chlorage 90 and and to the group of

1927), p 131 offe (1948), p 91.

odelay in Blastma) offe 1934, Heft 5/6,

Allies "Doodlebug" rand cable which w arate electric motors. ttery, drove the two nk contained about after stopping the

These mobile mines were not very effective because they could not move in reverse. On account of their low speed and thin armos, they were easily destroyed by the Allies estillery. Reference: Anon, Field Artillery Journal 34, 505 (1944). Ministure Terredos. See Explosive Powered Vortices.

Mining Effect. See Easth-Displacement Test. . . .

Mining Explosives. See Commercial Explosives.

Missiam and Missiam Seeling Plugs, Mipolama are plantic compositions developed in Germany during WW Il and used in the prepa of seals for some delay deconstors. Previous to WW II track seals were used. The Hipolam sealing place were made in three types:

a) Long greyinb-green plug with a single hole b) Shore greyish-green plug with two holes. The Mipolan

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composed of polyvinyl-chloride-31. Special Missure-31. and talcum 18%.
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1) W.Krannich, Kussessoffe im mechainchen Kouronionsachuen, Lehmann, Berlin (1943), p 25

2) BIOS Rept (Final), No. 833, Item No. 2, Lordon (1946) or PB Repr No 63,877 (1946)

3) PB Rept No 95,613 (1947), Sections H. 1 and I. More: Acceding to Mr. F. Ragier et al. (106 Rept 21-3 (1945), 9 5 there were three types of Mipolant a) Planticized poly-hinyl chloride b) Copolymers of polyvinyl chloride and scrible sesses and c) Polyvinyl chloride and maleic sesses.

Mischmotell (Mixed Metal) was an alloy of tare earths of the following approx compa: Ce 49.0. Le 25.6. Nd 16.0. Pr 4.6, Sm 2.0, Tt 1.0, Y 1.0, and Fe 0.8%, it was used as a component of delay elements for electric blasting caps. Other ingredients of delay elements included: Mg. Al. Ni and Zn homogeneously mixed with a fuel such as Si and an oxidizing agent such as Pb.O. Reference: .

H.M.Kerr, C.R.Hall, USP 2,560,452 (1951). C.A. 44. 1259 £19521

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be a good gelatinings for NC. Refgrance: Kant-Metts, Chemiache Untersuchung, (1944)p 161. Maille L. German tende name for Centralit L.

Maltie II . German trade name for Centralis II.

Monachite (Monachite), According to Marshall (Ref. ]) monachisen were Favier type explosives. According to Colver (Red 2) these emplosives were invented by East in Germany, Table 26 gives the composition of some monachites.

Monachit II b 64 3 14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Devigention	Am	K and/or No nitrate	TNX	Colled cotton	Flow	Char- cont	Alkali chloride	
	Monachit I Monachit II b Monachit II d	252	3	13 14 12	l'	4	1 1	17 19	

## Abbreviation: TNX Trinimetylese

Arcording to Szetthacher (Ref. 3), Monachit, was an explosive autmble for loading projectiles and it was prepared by mixing ammonium nitrace with the colld and liquid products of nitration of nolvent naptha. (See the Filter No 57, under Fillers).

1) Marchall v 1 (1917), p 392 2) Colver (1918), pp 258 & 634

3) Scottincher, Schiene- und Spomgetoffe (1933), p 278

Manabal , See general section.

Mortos (Morner). See under Vespons.

Marter Bomb. See under Bombe. Mortur Shell. See under Granate and under Spiget Mortar

Propertie.
Mp.14 (Solid Catalyat) used for decomposing the T-Stoff (bydrogen permishe) of liquid rocket propellants.
Broken procelais pieces, previously soaked in a 50% sola of 2-Stoff (q v) and dried at 110 for 24 hours, were cooked, for 10 missues in a 50% sola of 2 parts (a per annymise and 1 part K chromater and they retiried at 110 for 24 hours.

for 14 hours.

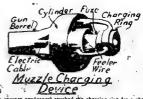
Then penerating around from T-Stoff, copper coils were
mixed with Mi-14 in order to accelerate initial decomposition.
The ratio of catalyses to copper was about 2 on 1.
Reference, CLOS Reps 30-11; (1945), p 11.

M-Stoff Commercial methyl alcohol, isp gr. 0,796, used as a component of some liquid rocket feels, such as C-Stoff (CIOS 30-115, p 10). "Multipede", Same as Hochdruck Pumpe (High-Pressure

Muniting . See Amministra

Musturd Pot Mine. See under Landminen.

Morris Charging Devices, used for finer adjustment of the range of some electrical time fuxes, consisted of a cylinder which fitted around the berral of a gua just behind the marrie had was connected by many of an electrical cable subject who was connected of mashs of an electrical color of the britishy and a voltage-control mechanism located at the bretch end of the gan. A charging rios, located in front of the possible, was held by means of three arms placed 10° spars. These arms also served for conducting the electric current from the cylinder to the ring. What a proelectric current from the cylinder to the ring. What a projectile equipped with an electrical time fust, such as the Type S/30 (ElZaZ S/30), reached the muzzle, the "feeler (located on the outside of the faxe and connected to



its storage condensed (outside the charging just for a short time. This resulted in the condenser of the time receiving as electrical charge called vertiles charge which acould make "from 50 to \$1,00 volts, depending on the voltage-courted mechanism referred to above. The "remise" charge was a supplementary charge to the initial charge of about 100 volus received by each electrical fuse proge to firing. If no vernier charge was applied, the time of burns was 16.0 becomes, but with the vernier charge the time could be adjusted between 3 to 30 seconds, depending to the voltage applied at the charging ring.

References Dept of the Army Tech Manual, TM 9-1985-3 1) Asso, Dept of the Army Tech Manual, TM 9-1985-3 (1993), pp 605-7 2) H.Bullock, Picatinay Arsenal; private communication

Muzzle Plash Reduction in Propellents . See . Flash Reduction in Propellance.

Myrol (Myrol). A liquid explosive consisting of a solution , of methyl nitrate in methanol or other solvents. The term Mysol was also used to designate straight mothyl nitrate. The material puppl prior to WW H (by cautiously dropping grow materials proper for war at (no cautiously dropping acclused into a miture of circin and sulfactic cald) proved to be impure, materially in storage and very sensitive to heart and chocks. During Well, Walters et al. (Ref. 2), developed a continuous method of manufacture, of methyl circumstems of method and distree from methods and distree information and distree from methods and distree information. more stable product than that prepe previously. A derniled description of the method of preparation is given in Ref 2, pp 9-10. Pure methyl nitrate proved to be an emplosive more powerful than NG, with a bringer exceeding any other high explosive known and with a sensitivity to shock comparable to that of PEIN. Pure methyl nitrate in a clear mobile liquid with a ba of about 63° (145°E) and is insoluble in water.

Insanuch as methyl airrate is very sensitive to mechanical action, it was found much safer to use it is solution in methanol. Such aclusions, called Myrol may be elected directly in the process of manufacture of methyl nitrate, all that is necessary is to use an excess of methanol. One of the most suitable solus proved to be the ascotropic minture consisting of about 75% methyl nitrate and 25% methagol, This mixture has a b p of 57,5

Mysols comes at loast 25% mathesoi will not evaparate t leave hazardone 100% methyl nitrate.

Notes Romes (Ref 1) walls Myrol, the mixture consisting of 19% methyl nitrate and 27% of technical methanol containing 63.4 H.O Tschinkel (Ref 5) says that Myrol consisted of 80 weight percent methyl nitrate and 20 weight percent

following are some properties of methyl astrace-methanol mintages: velocities of detonation ranging from 2400-4900 to 7500-8200 m/sec, volume of mans about 873 1/kg, hear of explosion 1640-1700 heal/kg, power and brisance-comparable to those of NG, sensitivity to shock-comparable to that of DNB, and toxicity-comparable to that of aliphatic

aitzates, such as NG and PETN. Like NG Myrol causes headaches and pulse excitation, but they disappear more rapidly than with NG. Caffein or coffee proved most successful in decreasing pulse excitation.

References: See under Myrol Explosives.

Myral Explosives. Mothyl aiteste and its mixtures with mechanol, beneure, airrobenteure, etc found extrasive application during WB Its signedienth of numerous liquid plastic, and solid propellants and explosives. Some of these mixtures were known as Erantasprengatoffe (aubactitute autolosives).

In the case of liquid explories or propellants, Myrol (northyl nirrate plus methanol) was used either by irestling or in mixtures with other liquids, such as bename; MNB etc. In some cases methanol was replaced completely by benkens, MNB etc. In the case of plastic explosives of propellants, Myrol was methanol was replaced completely for foom a soft (elly. In treated wich small amounts of MC to foom a soft (elly. In the case of solid explosives or propellants, Myrol was treated with a large amount (25-10%) of MC. m-foom-had eithy, or was mixtured with the usual folid impredients of dynamics; such as kitcell githe, insedunct (no exactic nitrosts, lizzin, etc.)

Due to the fact that Myrol is a volatile liquid, all mirrores contg it had to be kept in air-cight containers.

mirrores cong it had to be kept in air-ciphi containers. Several Mycol manufacturing plains, were built in Germany during the 2nd half of XV II and the total capacity was as high Brail 2000 metric total per conght. The largest of these plants was the Cartestary MC Total Constitution of the Constitution of

- hyrol explosives were used for the following purposes: I cliqued Myrol mixtures were used as rocket propellands, as charges for baggalore torpedows, land niness, bossessia future and for, cleaning our tretches, fortholes; tet 2) Plastic Myrol mixtures were used as military decolition
- charges and mining explosives

  3) Solid blyrol explosives were used as bursting charges in
  land mines, 50 kg projector mine, hand greundes, warheads
  of rockets V-1 and V-2, the bursting charge of Panzerfaust
  (AT thaped charge), bossers see.

More detailed information on Myrol Explosives and their uses follow:

- A) Liquid Myrol explosives could be used for military or comercial blassing-operations. When cited for descroping enemy installations, rocks, etc., Myrol could be pdured directly into holes or ginches, then avoiding being of follows. If no holes or crucks were present, they bould be usuify preduced, by wholesing small denseligion charges (such as in tis case or boxes) directly on the surface of a pock, courtest see. When found from underground was, liquid Myrol could be placed in several boxes connected by pipes (also tilled with Myrol) and lone and of the train detonated B) Liquid Myrol suplosives were found to be autisable for was to be parties topopoles.
- C) Liquid Myrol mirmar, such as methyl nicase. 75-80 and archanol 70-25% was considered to be suifatecopy as a figuid roctor forl. Since the case of propagation in this riquid is alow, there seems so danger that the combustion come might run back from the cimbustion chamber to the supply tank. It was found that this nixture could not be supply tank. It was found that this nixture could not be supply tank.

D) Liquid Myrol han found to be suitable for clearing our enemy trenches, foundhout, woods, etc. This clearing our operation was necessary obsertions to order to dearny mines, by other explosive or toxic devices left by the enemy. The following ingenious method, using Myrol in the form of woor, was developed by the Germans:

A home provided with two fuzes, filled with Myrol and cong a small box with liquid carbon diomid was dropped from a plane on the rargle. The impact of the bonds caused the first fame to jurse the box with CO, and to break the homb. This caused the vaporization and distribution of the Myrol shroughout the treach (or forbale) without giping or exploding it. The becond fuze (time fuse) caused the deconation of the explosing entirest consigning of Myrol i and Aurosphetic, oxygen. With sufficiently strong initiation the following reaction has been populated:

2CH ONO + 40 = 2CO + 3H O+N

When using this bomb in cold wenther, the vapor pressure of the mixture can be increased by incorporating a small amount of methyl nitrity, CH, ONO

E) Liquid Myrol, or straight methyl (or ethyl) sitmer, was used in the following device developed by Standinger:

Two small glane anopoules (kalba), noe filled with methyl sinkine (or-with beav bealing both) antened, and the other, with metallic nodium were flaced inside a fuse close to an 18 filler of a load mine, but separated from it, by a this above of plantic parenial. On top-of the bulbs was placed a glass supper, Pressure on the stooper caused crushing of the bulbs. This was followed by an explosive "Mexicioe hereon notify for earth) ninne, and sodium. An

a result of this the sheet of plantic was pieceed and the explosive charge issued the mine or bomb desponsed. Based on this principle, several land mines were developed. The smallest and simplest land mine consisted of a flask containing 80-90 a of Myrol. Through the neck of the flash was inserted a test tube reaching nearly to the bottom of the flank. An ampoule containing metallic sodium was placed in the test tube and on top of it a long plunger was carefully inserted. The pressure of this plunger caused breskage of the ampoule in the test tube thus brinking sodium in obstact with the Myrol. This action caused the detonation of the Myrol in the flask. The efficiency of these small mines was sufficient to disable a moror rehicle suc. Larger mines consumed of rectangular above iros house filled with 'We of 88/12-Methyl nitrate/MNB mixture and used the Myrolandium fure

F) Liquid Myrol employers were also used to increase this percentage delete of shaped charges, such as of 40/60-TNT/ROX "explosive. For this, a tental glass ampoule (bulb) filled with 90/10-46/rivyl nitrock/MMB mixture was, placed in the sir space (stand-off space) between the concluse surfaces of the shaped charge and the object to be pieceed, such as smoot, concrete, etc. For maximum effect the spiritance (fixely should be placed at the end of charge ferdient, from the traget and pointing contacts, if. For image, in shaped charge corpeione, initiation of the explosive should be accrete from the tail end and not from the more as it is done in occiniary correction.

G) Soft jellind enplosaves could be obtained by incorporating 3 to 37st jellind enplosaves as for instance, the cose constanting 1898. There jellies could be also instance with polyected solids, such as sodium nitrate and/or coit provder, thus obstaining solid explosives. The solid mittures were found suitable for filling the 30 kg projection mittage were found suitable for filling the 30 kg projection miner. These mines exercised autors him without

h) Haud jullied propellants could be prefid by incorporating in liquid abyrol (such as the lones conta 7:5-80% of methyl nizmus and 20-25% of methyl nizmus and 20-25% of methyl large 'amounts (23-30%) of nitrocelluloss. Such mixturus formed very uniform hand colloids subtout poses or creake and for this maxon, were lound to pe sustable as similar cocker propellants: if it is believed that some of these mixtures were used sowad the end of \$M\$, II as a liquid for VI-1 and VI-2 reclaims.

Because of high volatility of Myrol, the propellent sticks used in rockers had to be coated with a special

material impermeable to Myrol

1) A hard relited explosive prepd by gelatinizing NC with
a mixture of 91-95% methyl attract and 5-9% of MNB, was
used in some hoosters.

3) A solid, highly breant, explosive consisting of 30 to 40% of 73/2) April since with such amounts of hydrated. Ca nitrate and ligain that the oxygen balance was equal approximately to zero. The mixture was found suitable for Hilling bombs and land mines

s) The high brisance and fairly high sensitivity to shock of the last mixture was presumed to be due to the fact that Ca situate extracted and bound some methanol of the minutes, thus leaving part of methyl nitrate as free assistive droniers. Another explanation of free methyl nitrate was partial evaporation of methanol, which is more volatile then methy | nitrate-According to Dr H. Walt er, Myrola vaporine in the form of amostropic mixtures come about 25% methans b) In order to prevent an excessive liberation of free methys nigrate, it was broposed to use a nolvent less volutile thes methanol such as bensene or nitrobenseny, in order to prepare such a minture, the regular Myzol, which is a mixture of 75% methyl pitrate and 25% methanol, was shakes with bearens or MNB is presence of some water. This caused the methanol to go into the aqueous layer, while methyl oitrate remained mixed with benzene by MNB. E) A solid explosive contg 30% of a mixture consisting of 90 pares of methyl nitrate and 10 pts of bennese, plus 55% of hydrated Ca aitrate, 10% of finely pilverized aluminum and 1% of pulverized peat, had an oxygen balance equal approximately to zero. It was highly-bringst and powerful, although its nitrogen content men much lower than that of THT (14.2% vs 48.5% for TNT), This mixture was proposed as a littler for warbonds in rockets V-1 and V-2

Note: Microse of sectyl aistase 903 min beanes 10%, do not caderay any simplificant change in composition to anomaly of the composition of the composition of layrol mixtures may be easily and repidly determined by checking it "structure locks: L3 A solid Myrol explosive consisting of 85/15-Methyl airmst/MDS geltainingd with NC seed mared with sawdust and hydrated Cr sitress, was suitable for use in hand greadess of an mining.

<sup>9</sup>M1) A solid briman explosive consisting of Myrol and a pulverized mixture of K nighter, aluminum, and pest was swindle for hand greander, land mixes, and rock blasting. "References:

1) G.Römer, Report on Expinsives, PBL Rept 85,160 (1945).

2) H.Waiter et'al, German Development in High Explosives,
PB Rept 75,271 (1947) °.

3) J.G. Tuchinkel, Chem Eng News 32, 2586 (1954) (Progglamm for Rockets and Space Shipe).

"Numbers" (Risocorou). A unif-propelled mount formerly known ne the "Hoseines" consisting of an 38 am A/T gan on a Pajig II/IV or on a modified Pakple IV (See also mader Panace). Netter Be 369A, A surface in 1944 at the Bachem W hydrogen peroxide/methat carried 33 R4M rocket m witch 4800 lb, overall in ange 24.8 miles and mar from a vertical ramp and fr/min. Referente: K.W.Gatland, Missales, "Flight" Publicar



hydrogen peroxide/sephanol is its some 24 RZ 73 Pillen weight 4,925 ibs, overall max altitude 50,000 fs. controlled by a redie link ground radar. Ruference: & W.Gatland, De Flight? Publication, Loade

Mubelsäure (Fog Acid) is of 30/50 - Chlorosulfosie Reference: R.E.Richardson

Nebelwerfer 41. See under Nebenschlusstunder (Shun in the book by Beyling-Dreke

Needle Paint Projectile. Se Heedle Projectile. See An Projectile.

Moscodie. The name given for rock blasting, up-rooting were peepared from a aur Hexamit, which consisted amine; 60-70 and TVI 40-30 Reference. "Naohin, Schless" and Spre-

l/kg, power and brisance-comsitivity to shock-comparable to comparable to that of sliphatic PETN. Like NG Myrol causes ation, but they disappear more our coffee proved most successation.

Explosives.

nitrate and its mixtures with enzene, etw found extensive ingredients of numerous liquid nts and explosives. Some of as Ersstrappengatofic (aubatitute

aplos, een or propellants, Myrcihol) was used either by itself
liquids, such as benaues, MNB
of was replaced completely by
case of plastic explosives or
seed with such lamounts of NC
so case of old explosives or
ed with a large amount of NC
you was mixed—with the meanlen, such as kined gats, nawdust,
see, such as kined gats, nawdust,

Myrol is a volatife liquid, all be kept in sir-tight containers, uring plants were built in Gerof NW II and the total copacity ric tons per month. The largest himiserstaff Estrik of Dynamic ons/month.

med for the following purposes: rere used as rocket propellests, torpedors, land mines, books, ting out trunches, foxhales, erc percused as military demolition

see used as barring charges in mine, hand groundes, werbends e bursting charge of Panzerfagus tra, etc. m on Mreb! Explanives and their

n on which exhibition has need the

e could be used for military or intens. When used for destroying a, erc, Myrol could be poured, e, thus avoiding boring of folless, or present, they' could be easily all demolition that part (such as extly on the surface of a rock, or undergound work, lequid Myrol borse connected by pipes (also no end of the train deconated Myrole of the surface of a rock, and of the train deconated Myrole of the surface of

uch as methyl nitrate 75-80 and idered to be satisfactory as a the taxe of propagation in this and danger that the combustion the combustion chamber to the that this mixture could not be methyl in the range of 200 to methyle the the tax this mixture of the tax this mixture.

D) Liquid Myrol was found to be suitable for clearing our enemy trenches, loubolts, woods, etc. This cleaning out-operation was necessary amountmen in order to destroy mines, or other explosive or totic devices left by the enemy. The following ingenious method, using Myrol in the form of yapon, was developed by the German:

A bomb provided with two fuses, filled with Myrol and cong a small how with liquid carbon district was dropped from a plane on the targle. The impact of the bomb caused the litts fuse my burst the bow with CO, and to break the bomb. This returned the vaporization and distribution of the Myrol throughout the trench (or fothole) without igniting or exploding is. The second fuse (time fuse) caused the Secondino of the explosive mature consisting of they and assumptions of the explosive mature consisting of they of the constraints of the constraints.

2CH .ONO + 40 = 2CO +3H O+N

Then using this bomb is cold weather, the vapor pressure of the mixture can be increased by incorporating a small amount of methyl nitrite, CH ONO E) Liquid Myrol, or straight methyl (or schyl) nitrite was

L) Liquid Myrot, or straight metays (or stray) nature, was used in the following device developed by Standinger:

Two small sians ampoules (bulbs), one filled with methyl nitrate (or with less volatile sthyl nitrate); and the other with metallic sodium were flaced isside a fuze close to so HE filler of a land mine, but separated from it by a thin sheet of plastic material. On top of the bulbs was placed a class stopper. Pressure on the scopper caused crushing of the bulbs. This was followed by an explosive Peaction between methyl (or ethyl) nitrate and sodium As a result of this the sheet of plastic was pierced and the explosive charge inside the mine or bomb decounted. Based on this principle, several land mines were developed. The smallest and simplest lead mine consisted of a flack conthining 80-90 g of Myrol. Through the neck of the flank was inserted a cost tube reaching nearly to the bottom of the liable. An empoule containing metallic sodium was placed in the test tube and on top of it a long plunger was carefully inserted. The pressure of this plunger caused breakage of the ampaule in the test tube thus bringing sodium is contact with the levrol. This action caused the deconation of the Myrol is the flask. The efficiency of these small mines was sufficient to disable a motor vehicle atc. Larger mines consisted of rectangular sheet-from boxes filled with No of 88/12-Methyl nitrace/MNB mixture and used the Myrolsodium faze

F) Usuald Myrol explasives were also used to increase the posteroid grider of shaped charges, well as of 400,000 TNT/RDX "explasive. For this, a small giass improve (culb) filted with 90/10-866/yi mismax/MDM misruse was placed in the six space (stund-oid space) between the concluse surface of the shaped charge and the object to be pierced, such as amost, concrete, see, For maximum effect the igistator (stund-oil space) and produce the end of charge institutes, from the target and pointing towards it. For instance, in shaped charge topochese, including one and the object and the end of charge institutes, from the target and pointing towards it. For instance, in shaped charge topochese, including one of the explosive should be started from the target and page of the product of the down to the product of the

G) Soft jellied explosures could be obtained by incorporating, J to 3% of NC in any of the Myrol explosures, as for instance, the mass containing NMB. These pellies could be also mixed with pulverized solids, such as godum nitruse and/or componder, thus optaming solid explosures. The solid mixtures were found suitable for filling the 50 kg projector mines. These mines yeared a strong latest effects. ii) Hand jeillied propellines could be prople by incorposating, in liquid hypot (such as the base count 37-80% of another jein liquid hypot (such as the base count 37-80% of another jein large annuant (23-10%) of anteroclibulous, Such manager formed very uniform hard collored without poses or cracks and far fight reason, were found to be ministed as failed rocket properliments. It is believed that some of these participations of the properties of the prop

Because of high volatility of Mycol, the peopeliene sticks used is rockers had to be conced with a special autorial impersonable or Myrod 1) A hard justiced explosive peopl by geletenising MC with

 A hard satisful explosive people by helotinising NC with a minute of 91-95% mathyl nitrate and 5-9% of MNB, was used in nous houseen

J) A rolld, highly britant, explosive consisting of 30 to 40% of 75/25 leptol sized with such amounts of hydrated , Cn sixture and light that the oxyget halence was equal approximately to zero. The mixture was found suitable for Hilling humbs and lead onines

notes:
a) The high brisnace and fairly high sensitivity to shock of the last mixture was presumed to be due to the fact that Co situate entracted and bound some methinol of the minmer, thus leaving part of methyl sittate as feed agastive droplets. Another explanation of free methyl nitrate was partial evaporation of methanol, which is more volatile then methyl nitrate. According to De H. Walens, Myrols vapori as in the facet of apportunic mustures many about 25% methanol b) in order to prevent an excessive liberation of free methy aitmen, it was proposed to use a solvest less volatil then methanol such as because or nirrobectors. In order to proper such a minute, the regular dived, which in a migrace of 75% methyl signate and 25% methanol, was shaken with beakens, or MNS is presedely of some water. This caused the methanol to so into the account laver, while methyl aimste remained mixed with beasens be MNB K) A solid explosive coneg 30% of a minture consisting of 40 sures of methyl nicrote and 10 per of bennene, plus 55% of hydrated Ca nitrate, 16% of linely pulverized aluminum and 5% of pulverised peas had an oxygen balance equal approximately to zero. It was highly-brisant and powerful, although its nittogen contrat was much lower than that of TNT (14.2% we 18.5% for TNT). This mixture was proposed so a filler for warhends in rockets V-1 and V-2

Note: Mistures of metryl nitrate 903 pile beauer 105, do not coderpo say significant chappe in composition in storage. The composition of storage. The composition of styrol matteres may be easily and explied determined by checking it's "interactive index. L.) A solid Myrol explosive, consisting of 851/5-ltechyl interactive index plants of the control of the contro

NP. A rolid brisant explosive consisting of Myrol and a pulverized mixone of K nicroce, shusinum, and pent was signable for hand greunden, land minen, and sock blusting. References.

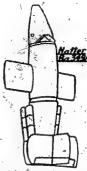
1) G.Römer, Report on Expinsives, P.B.L. Rept 85,160 (1945) 2) H.Wetter et 21, Gensein Development in High Explosives, P.B. Rept 78,77; (1947)

3) 3.5.Tachiskei, Chem Eng News 32, 2586 (1934) (Propgliests for Rockets and Space Shion).

"Neuman" (Rispectson). A self-propelled mount formerly known so the "Homisse" concluding of an 30 sm A/T gan on a Pajin ill/IV or on a modified Pakpiw IV (See also space Panace).

Neter Bu 369. A surface-to-ast, piloted missale developed in 1944 at the Backen Verke Gmbbi. It was propelled by hydrogen personule/meshand - hydratins bydrate say Gub recket properties in its accus. Lanaching with 1960 of the control of the cont

Reference: K.W.Gatland, Development of the Guided Missiles, "Flight" Publication Landon (1952),pp 10 & [14-15.



Notice Sec 1478. A surface-to-all, piloted mintile developed in 1945 of the Sected Verice Gabbi, it was propelled by photograp pounds for printed in the none 24 RJ 75 Hbm (q v) rowther projection, insuccious to the projection of the projection of

https://discountry.com/ Reference: K.W.Gatland, Development of the Guided Missile, Flight" Publication, Loodon (1952) pp 114-5.

Nabelsiure (Fog Acid) is a smoke-somes agent consisting of 50/50 - Chlorosulfonic acid/Sulfut trianside (by weight) Reference: R.E. Richardson et al. CIOS, Rupt 25-18 (1945), p. 6.

Nebelwerfer 41. See under Rocket Launchers-

Nebensellensumder (Shunt-Circuit Igniter) is described in the book by Beyling-Drekopf (1936), p 216.

Heedle Point Projectile. See Arrowhead Projectile.

Noodle Prejectile. See Arow Projectile and also Gresser Projectile.

Moorodit. The same given after WV I to explosives used for each blauting, up-tooting assump, etc. These professions were prepared from a surplus military-jacquosive called Hexamit, which consistent of recasain the minter 650-70 and 77:74-0-105.

Reference. r-Nacom, Schiese- and Sprengstoffe, Drugdon (1927), p 71. Shoutchments (New Dahmenite). One of the earlier permissible mining explosives: Am nitrate 68 TNT 10, flour 213. K nitrate 2.0. Na chloride \$5.5, and coke dust 2.0% [ Colver, (1918) p 249 i.

Newlynamit - Austrian name for Gelatin Dynamite.

Neunkirchen Testing Gallery (Schlagwetter-Versuchsstrucke in Neunkirchen). See general section under Galleries, Testing and A.Sorethscher, Schleen- und Springstoffe, p 248-

Neu-Nahalle (New Nobelite). A class of permissible explosives used before and after WW L. Table 27 gives some examples.

Table 27

Composition (%) and	٠.	New-Nobelines								
zome properties	1 .	12	14	15	16	C				
Am gitrase	27.0	36.0	30.5	34.0	54.0	50.0				
.NG + NC felly .	26.0	30.0	30.0	12.0	12.0	12.0				
Glyceria	- 1	-	1	- 1	1	4.0				
Gust-trugar	1 - 1	3.5	- 1	-		-				
Careal meal	9.0	- 1	6.4	-	١.	6.0				
Yood seal	1.0	- 1	-	4.0	3.0					
Nitrocompounds ,	2.4	6.00		2.0	3.0					
Na astrate	- 1	- 1			-	3.0				
Alkali chloride	29.0	30.5	33.1	28.0	28.0	20.0				
DNT	8.0			-	1 2	-				
Tale ?		-	۱ - ا		-	3.0				
Ocygen Balance,%	-14.9	+4.6	-1.6	+0.6	+2.8	-0.6				
Trausi Test, cc	230	220	230	225	225	220				
Pb Block Creshing, mm	-	~	- 1	r.,	13.0	-				
Velocity of Detoma-	-	. •	Э.	群	4600					
tion,m/sec	1			a .		ì				
Density of Chetridge		ا - ا		-	1.20					
Sensitiveness to				-	No 1					
Initiation, Requires at			,		CAP					
least:		1	1		, "	٠,				
'Gap Test, cm		۱.		-,	25					
Heat of Explosion.		i - i	١.		641	١.				
kenl/kg	1 .	1		L.	1 ~					

(See also Nobelit).

References

P.Naoun, Nitroglycarin, etc., Baltimore (1928), pp 411, 441 and 444.

Neuwentfultt (New Ventohalite) One of the permissible explosives used after WW 1: Am sitrate 70.3, DNT 10.9, flour 2.0, and Na chloride 16.8%; Trauxi Test 309 cc. References:

1) Marshall, v 1 (1917), p 391 2) Barnett (1919), p 138.

Nigo German abbreviation for Propognanidin, also called "G-Sala", Abbreviation used in this book is NGu.

Nipolit. Nipoliter A type of NC-DEGDN-PETN propellant or ex-ploatre, developed during WW II at the Kraiburg plant of the Deutache Sprengchemie GmbH. The following com-positions are listed in Refs 2, 3 & 4 (See Table 27s.)

Composition (%) and dimensions	Nipelit tubes	Mipolit Sticks				
NC(12.6-F2.7% N) DEGDN 4 PETN (unwaxed) Stabilizer MgO Graphite	34.1 30.0 35.0 0.75 0.05 0.1	29.1 20.0 50.0 0.75 0.05 0.1				
Length of grain Diumeter of grain Hole Diameter Hole Depth Veight of grain Calonfic value, cal/g	80 mm 27 mm 9,1 mm 30 mm 42 g 1300	50 mm 9.1 mm				

Note: MgO was added to neutralize soid developed or decomposition, and graphite was added to prevent the

accumulation of bazardous static electrical charges, For the preparation of Nipolit, a water alury of NC was air-aginated in a lead-lined vessel, with the desired amount of DEGDN. After 15-20 manutes stirring the mass was centrifuged to remove all but about 75% of water and the resulting cake was kneeded, at about 30°C, is a Weiner-Pleiderer machine with the calculated amount of pulverized PETN, some water, ambilizer, MgO and graphies. After about 15 minutes of theading the mass (passe) was trans-ferred to cubber lined bags where it was allowed to age for 48-77 Kouse.

a) According to Ref 4, all raw materials with the exception of PETN were added in the paste mixing stage, while PETN was added during incorporation

b) It was claimed that the aging process insured better gelacinization and reduced the bindency to fire during the

rolling operation which followed c) The calorific value of the materials was carefully adjusted to between 450 and -10 calories an penniscible variation from specification value for the propellate being processed. If the thousand the calorific value for the propellate to the processed of the p

Rolling and grapulation were carried out an follows: About 18 kg of the aged paste was passed, about 19-20 times, through a past of vertical rolls maintained at 90-100 (Ref 3).

Note: According to Ref 4 rolling was conducted at temperature not higher than 75 C.

The resulting sheet (moisture content about 3%), was made by hand into a carpet roll and transferred to the press-house where it was kept in a steam heated oven prior to transfer to the extrusion press. Then the mass was extruded at a pressure of 200 kg/cm and at a rempersure of about 80° and, the resulting tubes (or aticks) into desired lengths.

After drying the cut material for about 24 hours at 40-50°, the moisture content was reduced to about 1%.

The next operation consisted of wetting each stick Nipolit with accrone and pushing the arick into a nube Nipolit flush with one end. This left a cavity 30 mm long in each tube to accomminte a detonator. The stick

References: 15 D.W.Stickland et al. PB Report 1820 (1945), p 38 2) A.A.Swanson & D.D.Sager, CIOS Report 19-24 (about

1946), pp 3-4.
3) T. Urbanski, Przemysł Chemiczny 27(4), 487-94 (1948)
C A 43, 4465 (1949) "Recent Development in the Field of
Explosives" (Translated by Dr Ivan Simon of Arthur D. Little Inc)

4) A.A.Swanson, D.D.Sager & L.M.Sheldon, Ordunoce Target Report No 68 (Spec Rept No 2071); Matufacture of Solventieus Type Powder and Nipolit, by the Deutsche Sprengchemie, Kraiburg Wks.

Mitrie Acid (Salpeternaure). Its preparation, properties and uses are described in the general section. Nitric ecid was produced in Germany during WW II, mostly by the ammonia exidation process, in quantities exceeding 140,000 tons per year. In addition, there was also available the 17,000 tone produced in occupied Austria, Czechoslovakia and Poland.

For the manufacture of highly concentrated (hoch-konzentzierte) uittac acid, the so-called "Hoko"  $(q \ v)$ process was developed.

Production of nitric acid in Germany was controlled by the Stickstoff-Syndikat.

Following is a partial list of the principal producers of matric acid in the Septem Zone of Germany:

a) Badische Analus- und Sodafabrik A -G, Oppau

(formerly IG Farbenind A -G) b) Bergwerkgenellachaft Hibernia, A -G, Herne, Stickstoffwerke, Wanne-Eickel

c) Chemische Fabrik Kalk GmpH, Köln-Kalk (Founded'

d) Elektro-Nitrom A -G, Rhina, bei Laufenburg (Baden)
e) Farbwerke Höchat, bei Fmakfurt n/Main (formerly IG Farbenied A -G)

f) Geworkschaft Victor Chemische Werke, Castmo Rauxel Z. Ventalien

numers 4, westerlies 3) IG Farbenindustrie A -G with plants at Leverkusen (formerly Fried Bayer & Co), Bochum-Gerthe, Rul-(lefter called Chemische Werke Leckingen Gubbl) (was founded in 1916) and Herne-Sodingen, Rule (formerly CAVEG)

h) Ruhrehemie A -G , Oberhausen -Holten, Ruhr (founded in 1927 under the name of Kohlenchemis A -G)
i) Wirtschaftliche Forschungs (mbH (WIFO) with plants

i) Varietamilitate Forestuarga umbri 1917 (1) with plants
at Embera, Kr Lünsberg (lounded in 1939-1940) and at
Langelsbeim, Hart (founded in 1939).
According to Ref 3 the following plants in the Eastern
Zone were dismanifed and shipped to Poland or Russia;
i) Chistianssatid and shipped to Poland or Russia;
i) Chistianssatid and boter, Brandenburg (Oynamit

A -G) k) Binerield South (described in Ref 1) l) Döberits

m) Haydebitck

s) Launa o) Piesmritz (Bayeriache Stickstoff A +G)

p) Soudemanaen e) Wolfen (described in Ref 1)

1) R. L. Horley, BIOS Final Rept 889, Item? 22 (1946)

W.Kenworthy & F.R.Dell, BIOS Final Rept 1232, Items 22 & 31 (1946)
 F.M.Irvine et al, BIOS Final Rept 1442, Item 22 (1946).

Mirrobaronis (Nitrobaronize). An early type of aluminized explosive. The following mirrores, described by L.Medard, Men Artil Fr 22, 596 (1948) are given in Table 28.

Composition (%) and some properties	Nicro- beronite A	Nitro- beronite B
Alaminum	~5.0	- 2.0
Am astrate	82.0	69.0
Nitroglyceria	5.0	22.0
Collegion cortes	. 1	-0.75
Liquid DML	5.0	3.0
Petroleum tar	1.5	2.0
Wood men!	1.5	1.25
Ph Block Expansion (Picric acid = 100) (See "C u p " in the	124.0	125.5
French Section)		

Nitrocellulose, Nitrezellulose oder abbreviated in German to Nz (Nitroce in this work to NC) See general sect

Get 118

Due to the absence of native cotte nitrocellulose was prepared from wood p Following is a brief description of the WW II at the Krümmel Fabrik of D Refs 1 & 2:

a) Bleached cellulose in the form from wood pulp), was broken down into flocks and then brown into Is where the moisture content was re

b) 25 kg of cellulose flocks we into a nitrator of 0.7 m capacing of mixed acid (MA), prepd by forti

(SA) from previous batches.

Note: For NC of 11,25-11,50% N co.

MA consisted of 20% oftric, 62-64% water; for NC of 13,213,3% N calls composition of MA was 22,5% nitrie,57, 9-10% water. The time of nitration

the temperature 30 . c). The contents of the nitrator centrifuga: (one for every 4 nitrat

d) The apparated apent acid (S. filter drums where the small 'to were separated and then to the fortif e) The NC which was removed from the filters was carried by a stream washers where the bulk of the a stirring with water

f) The slurry was then pumped to vessel provided with a double i upper one was false, consisting which the wash water was allowe end of the boiling period. Beiling acmospheric pressure: 3 bours to hours for Schienswalle

g) After removing the soid water, by a stream of water into the pre where the material was cooked for less steel autoclaves, starting at at 342-145°.

Note: Pressure cooking find a double the -viscosity of NC, to the desired 1 up the stabilization. The details of t varied from plant to plant.

b) A sample of cooked NC was sent if the viscosity of the NC (as de method in a 3% acetonic soin) was range, the charge was dropped into such as the follander or Bannin NC was beaten for several hours. slurry was maintained between 7 ac periodically. It usually required 3 to i) The pulped NC plus water was i rotating sleves where more water a amallet particles of NC passed the while the latter particles were rota larger particles were removed by pulped, while the slurry of smalls dewatering device (rotating drum sie i) The dewatered small-particle mat

0 50.0 0 12.0 4.0 .0 0 20.0 2.8 -0.6 25 220 3.0 600 .20

pp 411.

rmiesible NY 10.9. 309 cc.

lant or explant of ing com

Composition (%) and dimensions	Mipelit tubes	Nipolis Sticks
NC(12.6-72.7% N) DEGDN 4 PETN (unwaxed) Stabilizer MgO Graphite	34.1 30.0 35.0 0.75 0.05 0.1	29.1 20.0 50.0 0.75 0.05
Length of grain Dameter of grain Hole Diameter Hole Depth Weight of grain Calon fic value, cal/g	80 mm 27 mm 9.1 mm 30 mm 42 g 1300	50 mm 9.1 mm 

decomposition, and graphite was added to prevent the seconjoustion, and graphite was adoed to prevent the accumulation of hazardous nature electrical x-integrate and accumulation of hazardous nature electrical x-integrated in a lead-lined vollet, water aluny of NC was an expected in a lead-lined vollet, which we be desired amount or DFGIN. After 19-20 manutes starring the mass was a carning and to renove all post about 25% givener and the carning and to renove all post about 25% givener and the post of the pos

PETN, some water, smalliser, MgO and graphite. After about 15 minutes of kneeding the mane (paste) was transferred to rubber lined bags where it was allowed to age for 48-72 hours. Notes:

Notes:

a) According to Ref 4, all raw materials with the exception
of PETN were added in the paste mixing stage, while
PETN was added design incorporation
b) it was claimed that the aging process inswed by-tree
plantingston and reduced the indexery so fire during the

gelatinization and ordered the indexery to (ine during the colling operation which followed in a territal was carefully colling operations which followed in a calcinities as permitted bit expressed to the other colling and the collines as permitted by processed. If outside these limits, the material was re-turned to the sincers and the calcuffic value either reduced by adding centralities of hydrocullulone or increased by adding the colling of the calcuffic value of the colling and the colling of the calculation of the colling of the diding were paster consisting of NG and DEGDM. Each mixer was anapled as least every 8 hours. For a total charge of 18 kg a maximum of 3 kg of records material was Rolling and granulation were carried out as follows:

About 18 kg of the aged pasts was passed, about 15-20, times, through a past of vertical rolls maintained at 90-100 (Ref 3).

Nipolit (core) acted as a booster.

Note: According to Ref 4 rolling was conducted at a temperature not higher than 75 C. The resulting shest (societies content about 3%), was made by hand into a carpet roll and transferred to the made by hand into a carpet foll and management to the prise-house where it was kept in a attent heated over, princt to innester to the Extrusion press. Then the mass-was servided at a pressure of 200 kg/cm and at a tempera-ture of about 80° and the resulting tubes (or scicks) fast

into desired lengths. After drying the cut material for about 24 hours at 50°, the moisture content was reduced to about 1%. The next operation consisted of wetting each stick Nipolit with accrone and pushing the stick into a tube Nipolit flush with one end. This left, a carrier 30 mm long in each tube to accomposate a detonator. The stick

References 15 O.W.Suckland et al. PB Report 1820 (1945), p 3h 2) A.A.Swanson & D.D.Sager, CIOS Report 29-24 (about

3) 1. Urbanski, Przemysł Chemiczay 27(4), 487-94 (1948) C A 43, 4465 (1949) "Recent Development in the Field of Explosives" (Translated by Dr Ivan Simon of Arthur D.

4) A.A.Swanson, D.D.Sager & L.M.Sheldon, Ordnance Target Report No 88 (Spec Reps No 2071), Manufacture of Solventless Type Powder and Nipolit by the Deutsche Sprenachemie, Kraiburg Wke.

Nitric Acid (Salpenerahuwa). Its perparation, properties and uners are described in the general section. Nitric acid was produced in Germany during W II, mostly by the amononis oxidation process, in quintaine acceeding 140,000 toos press. In addition, there was also available the 17,000 toos produced in occupied Assuris, Czechoslovakia and Poland.

For the manufacture of highly concentrated (hoch-tonzentriete) sirie acid, the ho-called "Hoko" (q v) process was developed.

Ronzenteste) strese acid, the io-called "thoko" (q v) process was developed, the cid in Germany was controlled by the Sickatori-Cyncilas. Following it a paraial list of the principal producers of nitric acid in the beatern Zone of, Germany:

a) Bediriche Anilba—und Sodafabrik A-G. Oppose (foresty) IG Fastenind A-G)

b) Bengered-prestletchaft lithermin, A-G, Henne, Stick-

stoffweeks, Wanne-Eickel c) Chemiache Fabrik Kalk GmpH, Köln-Kalk (Founded

d) Elektro-Nitsum A.-G., Rhina, bei Laufenburg (Baden)
a) Farbwerke Höchas, bei Fenaklust a/Main (formerly

IG Farbenand A -G) f) Gewerkschaft Victor Chemische Berke, Castrop-Rausel 2, Bestehlies

s) IG Farbenindustrie A -G with plants at Leverkunet (formerly Fried Bayes & Co), Bochun-Gerthe, Ruhr (lafte called Chemische Verke Lothringen Gmbli) (was founded in 1916) and Heroe-Godingen, Ruhr (formerly GAVEG)
b) Ruhrebemie A -G , Oberhausen Holten, Ruhr (founded

in 1927 under the name of Kohlenchemie A -G )
i) Wirtschaftliche Forschungs GmbH (WIFO) with plants

Variachabiliche Fouschungs (smort WIFU) with prants se Embane, fir Lüneburg (founded in 1939-1940) and et Langelehrin, Hare (founded in 1939). According to Red, 3 the following plants in the Eastern Zone were dissonated and shipped to Polsand or Russia: 1) Chiclainnamenta et d. Sobrts, Brandenburg (Dynamic

k) Bitterfeld South (described in Ref 1)

m) Heydebrock

a) Launa o) Piesterius (Sayerische Stickstoff A .G ) p) Sondemauses
p) Wolfen (described in Ref 17

Referencess

Returnación 1) R. Likotiey, BIOS Final Raps 889, Itani 22 (1946) 21 W. Kraworthy & F.R. Dell, BIOS Final Raps 1252, Itani 22 & 31 (1946) 3) F.M. Livine et al., BIOS Final Raps 1442, Itani 22 (1946)...

Hitrobwoole (Nitrobaronice). An early type of aluminized explosive. The following mixtures, described by L. Medard, Men Artil Fr 22, 595 (1948) are given in Table 28.

#### Table 28

Composition (%) and some properties	Nitro- barouice A	Nitro- baronite H
Alomisan	~5.0	. 2.0
Am nitrace .	82.0	69.0
Nitroglyceria	* 5:0	22.0
Collegion cetters	. I.	-0.75
Liquid DNI	5.0	3.0
Petroleus tar	1.5	2.0
Food meni	1.5	1.25
Pb Block Expunsion (Piexic next = 100)	124.0	125.5
(See "C u p " in the. French Section)	• .	

Nitrocallulose, Nitrocallulose oder Schlessboumwalle abbreviated in German to Nz (Nitrocellulose, abbreviated in this work to NC). See general section under Cellulose. Due to the absence of native cotton in Germany, their nitrocellulose was prepared from wood pulp.

Following is a brief description of the method used during WW II at the Krummel Fabrik of DA-G, as given in Refs 1 & 2:

a) Bleached cellulose in the form of crepe paper (made from wood pulp), was broken down in special machines into flocks and then blown into large drying chambers where the mossture content was reduced from 6-7% to

1-2% b) 25 kg of cellulose flocks were fed with stirring into a nirrator of 0.7 m capacity wontaining 1125 kg of mixed soid (MA), prapd by fortilying the spent acid

(SA) from previous batches.

Note: For NC of 11.25-11.50% N called PE-Wolle, the
MA consisted of 20% nitric, 62-64% sulfuric and 16-18% water; for NC of 13.2:13.3% N called Schiesswolle, the water; for NC of 194213.33 N called Schreswolle, the composition of MA was 25/25 nitric,67.565.55 allutic and 9-10% water. The time-and citration was 30 minutes and the temperature 30. c) The contents of the citrator were emptied into a

centrifuge (one for every 4 nitrators) and upun for 6 minutes at 900 mm

d) The separated spent acid (SA) went to coupling filter drams where the small torn particles of NC were separated and then to the fortifier.

e) The NC which was removed from the centrifuges and the filters was carried by a stream of water into preweshers where the bulk of the acid was removed by stitting with water

f) The aluny was then pumped to a preliminary boiling vessel provided with a double bottom of which the upper one was false, consisting of a acreen through which the wesh water was allowed to flow off at the end of the boiling period. Boiling was carried out at amospheric pressure: 3 hours for PE-Walle and 6-9 house for Schiegewalle a) After removing the acid water, the NC was carried

by as stream of water into the pressure boiling plant. where the material was cooked for 6 minutes in smin-less steel autoclaves, starting at 100° and finishing at 142-1450.

Note: Pressure cooking find a double purpose: it reduced the wiscoulty of NC, to the desired level and it speeded up the stabilization. The details of the pressure cooking varied from plant to plant.

h) A sample of cooked NC was sent to the laboratory and ". if the viscosity of the NC (as det'nd by the Hoppler method in a 3% acctonic soln) was within the gentred range, the charge was dropped into a pulping machine such as the Hollander or Banning-Seybold, Here the NC was bearen for several hours, while the plf of the slurry was maintained between 7 and 9 by adding sods periodically, it usually required 3 to 4 kg of sods

i) The pulped NC plus water was pumped into vertical rotating nieves where more water was added. Here the smaller particles of NC passed through avenue on sieve while the latter particles were retained by it. Then the larger particles were removed by accepers to be repulped, while the slutty of smaller particles went to a dewatering device (rotating drum sieve)

i) The dewatered small-particle material was transferred

2 ml of NO per | g of PE-Wolle) 'h) If the material was guncotton (Schienswolle) the above treatment was not sufficient and heating had to be continued until a satisfactory B-J Test value was obtained (Not more than 2.5 or NO per 1 g of Schiege-

I) In order to obtain NC of the desired N contest and viscosity, several batches were blended in large vata prayided with stirrers. The blended material was then stirred with a large quantity of water and run through Arie maps.

Note: Grit traps were cound vennels, conical at the hage-The slury entered from below and its velocity decreased as it flowed appeard (due to the increase in diameter of the of the weaseling such an extent that all the heavier particles (such as srit or dirt) dropped to the lower part of the vessel while the particles of NC continued to travel upward m) After "de-gritting", the slurry was thickened up

by passing it through a dewatering rounting drum for final dewarering. The partly dewarered marerial was sent to a centrifuge where it was spun at 1000 ross a) The resulting NC was shovelled into a mine-lined Iron container (provided with a cover), where it was weighed, inhelled and disparched either to propellent plants or to a plant manufacturing "Robpulvermasse" (Raw Page)

e) As the waste waters from the manufacture of NC contained so appreciable amount of suspended small . particles of NC , it was required that these particles be removed before the water was allowed to leave the pleat size. One method was to allow the water to reathrough so-called Donech traps. These were conical vessels with the aution part at the horson. The water flowed from the bortom noward: as the area of the vessel increased, the velocity of flow was reduced to such an extent that the suspended particles seried. The accumulated fines were periodically removed from the vessel.

Note: Is many Gennag propellants that were examined as Picatingy Amenal during WW II, the nitrogen content of the NC was around 1210.2%, which means that the NC was intermediate between the PE-Volle and Schiesewolle. One of the DEGDN propellants contained NC with N=10.4% (See under Propellants).

Stembacher (Ref -3) describes briefly various methods of manufacture of NC and gives compositions of mixed acids used for the preparation of NC with nitrogen contents of 11.6, 12.5, 12.75, 13.2, 13.4 and 13.7% Yields and sofubilities of various mitrocalluloses in 3/1-sther/elcohol mixture are also given.

References: 1) O.W.Stickland et al. Ceneral Summary of Explosives

Plants, PB Rept 925 (1945), pp 50-55) 2) Lee Nutting et al, Manufactule of NC at the Krimmel Plant of the Dynamit A -G , Pf Rept 16,666 (1945)

3) A.Scettbacher, Spreig- und Schienntoffe, Runcher, Zurich (1948) pp 62-66.

Mirrocallula seculver (Nitrocallulose Propellent or Single Base Propellant). See under Propellant.

Nitrocklarin . A low-freezing explosive oil used in the manufacture of some dynamics. It consisted of 80% diairrochlorohydrin and 20% NG and was appared by signation of commercial monochlorohydrin containing glyceria F.P. Naoum, Schiene- und Sorengatoffe (1927), p 113 ].

Nitraform or Trinitromethone, described in the graritiristorie er l'infirementane, described la the general section, was prepared and investigated during will in Germany by Dr Schiemellachmide, He recommended the preparation of nitroform from turn-irromathane, ponanium bydroxide-and bydrogen peroxide, according to the following

C(NO.) . + 2KOH + H.O. = (NO.) . CK + KHO. + O. + 2H.O His preference for the above method was based on the claim that the method previously suggested by Orion and HcKee, depending on the reaction between segmainmenthane, by bydroxide and bydraune, is hazardous sance, is addition to K salt of natroform, sydragoic' acid and not named

Nitroform was liberated from its K salt by distillation at reduced pressure to the presence of sufferie neid.

The resulting product had a mp of 26.4° as against

obtained by some previous is ventigators.

Dr Schimmeischmidt also, found that nitroform may be extracted from the reaction product of scentiene and simic acid using liquid nerrogen dioxide at 0 as a selvent. This method of attrotors recovery was considered at of great importance, suce the product so obtained could of great importance, sures the product so photosic doubte be converted to intensitome these usels—only a small number of subtrict soid (See also index Tetrasitomethano). Note: Due to the abovergo of subtrict soid, which developed in Germony during WW II, may substance which rould be used in place of subtrict oriel were considered highly

used by place of sufferic soid was considered nightly desirable. For this research, the use of liquid nitropes and all the sufferictions of selections of the sufferiction of the sufficient of the sufferiction of the sufferiction of the sufficient of the su

also was found to be superior to Ne survey as once it was not destroy the resolution. In a contrast the resolution of th

The resulting Trintrepropulmethyl Ketme one an explosive comparable in power to RDX

b) When a stream of acetylene was hinkled through nitrofome commining a little mercuric nitrate the follo reaction took place: HCICH + CHINO J + CH CH-CINO J

Interaction of this compound with nitroform gave me extremely powerful explosive, helieved to be a mixture of 1,4 -DI (trinive) betwee and Hemmitreinebuteness

sitroethanoi: HCHO+CH(NO) - CH2OH-C(NO)

Reference: W.Hunter, BIOS Final Rept 709 (1946), pp 2 & 6 = 10.4 Nisconfettoe eteriore. Under this title 1. Daniel Dictionnaire

den Matteren Explosives, Peris (1902), p 523 described as explosive, consisting of NG+NC jelly mixed with about 10% of victic scid. This missare parented in 1887 by the Deutsche Sprengstoff Gesellschaft of Hamburg did not prove to be very stable.

Mitroglycerin and Nitroglykel (Nitroglyceria and Nitroglycol, abbreviated in this work to NG and NGc). The manufacture and properties of these substances are deacribed in the general section under Glyceria and Glycol, respectively.

In Gormony the nitration of plycerin or of glycol (ethyleneglycol) was conducted either by a batch process or by a continuous method, such as that of Schmid, Mrisanet or Biazzi. The nicration was made either separately for glycerin and glycol, or more often as mixoures, such as alycenia 60 and glycol 40%.

The batch method of mitration of glycerin, or of glycol or of their mixtures at the Krummel Fabrik Dynamit A -G may be given as an example:

al 300 kg of glycerin was run into 1470 kg of mixed acid, consisting of HNO 50; H 50, 52 and H 0-2%, countd in a stateless seed necessary which was provided with an air stirrer and cooling coils

b) In order to maintain the mixture in the nitrator at about soom remperature, the brine, cooled to as low se -12° was circulated through costs

c) After about 25 minutes of nitration, the air agitation was scopped and the mixture allowed to stand, in order to accelerate the separation of the nitration products. 70 g of an 80/20 mixture of Na flouride and of ignited kiesel subt was added

d) The separated oil was sir-aritred at 12° with 400 liters of water and after removal of the water, the oil was air-actived for 12 minutes at 40° with 500 1 of 2% sode ash soin

e) After cooling the mixture to 280, while still continuing to stir, 50 g of pulverized calc was added and then the mass was allowed to stand

() The separated oil was run through a pipe which ended some distance short of the storage cank. From that and of the pipe, the oil was transported to the mak by means of hand trucks

a) The spent acid which in the case of NG weighed about 1200 kg and had the approx compa: HNO, 7.5. \*\* about 1100 up and Hg 0 17,7%; and in the case of NGc (altroduce)) weighte ship: 1930 kg and had the approx compet RNO, 8.5, H SO 74.5 and H O 17%, from which the bulk of oil had been removed, was allowed to send for acveral days in lead-lined vessels, called "After Separatora". The separated oil was washed in a small auxiliary weasel first with water and then with 2% and and separators.

Note: The total yield of oil was reported to be about 211 parts per 100 of alyceria. Other plants separted worlds canging from 231 to 234, and for NGc 230.

h). The strent acid of (g), was bloom by comprehedair to a tank and from there to a separator in order to recover some more of the explosive oil. Then the said was transferred to the Recovery Plant where the nigne acid was distilled off, leaving week sulfuric acid as a residue

il As the waste wash waters of operations (d) and (s) contained emelf amounts of oils (NG, or NGc) it was necessary to remove the oils before allowing the waters to run into a stream, lake, etc. This was accomplished by allowing the waters to run through large settling tanks, sometimes installed in cascade form I In order to economize on the consumption of name

acid and to prevent poisoning of personnel all nature acid fumes (no well so netrogen oxide gases) were drawn from both the nitrator and separator by means

of a suction device and led to an absorption tower in which they were met by a spray of water to dissolve them and form nitric and nitrous acids

k) A sample of washed oil [ see operations (d) and (g) ] was sent to the laboratory for testing. The Abel test at 82" was usually about 40 minutes.

Note: The results of the Abel Test were usually higher than in the US practice. The high German results are presumably due to the fact that talcum was used in the separation of the oil (see operation (e)). The Americans do not use talcum to improve the separation of NG or of NGc from spens acids.

The Sythen Faunk of & A S A -G also used the barch process, while the Schlebusch Fabrik of Dynamit A -G had three different NG installations:

s) Batch piant

b) Continuous plant with Meissner nitrator and Biasti separators and washers c) Continuous plant-with Biazzi nitrator, separatora and

washers, installed by Mario Bisani, Switzerland.

In the Biazzi inscallation, which had an output of 800 to 1000 kg per hour, the aitrator was a cylindrical stainless steel vessel approximately 2 ft in dismeter by 8 ft 6 in deep (See Fig. 1, p A2/9 of Ref 5), Cooling was carried out by sunning chilled brine through a series of six concentric coils suspended inside the nitration veneral. Stirring was carried out with a mechanical stirrer situated in the center of the inner cooling coil and running at about 400 rpm. A tangential separator was placed about 2 ft below the level of the outlet of the nitrator and a 2nd separator followed the lat. The mixed acid-used in the nitration was approximately 50/50-nitric acid/sulfuric acid stored in a tank for at least 10 days and then passed through a stainless steel gauge before use. Procedure: -

a) The mixed acid, 5 parts, and giveerin (or siven) or glyceria plus glycol) I part, each metered by means of a commeter, entered continuously and simultaneously. the lower part of the niteson

b) The emulsion consisting of nitrated product (oil) and spent acid left the nitrator and was sup straight to a tangential separator placed about 2 ft below the level of the outlet from the nitrator

c) The separated acidic oil went to a stainless areal vesuel 11/2 ft in diameter and 2 ft deep, provided with 'a mechanical stirrer, where the oil was washed with an equal volume of water, while the apent acid (which in case of NG, had the approximate compositions HNO 11, H SO 73.5, H O 14 and NG 1.5%) went to a special lead separator, called Scheider. This operation permitted the removal of some additional oil before the acid was fortified to be reused for nitration of the next bath, or before the acid was sent to the recovery

d) After ore-making the oil with water, me emulaton Howed continuously into a tangential separator from which the senarated oil went to the pext part of the process

a) The acidic water (which in the case of NG had the approximate composition: HNO 10.6, H SO 1.1, H O 87.6 and NG 0.7%) went to another separator outside a mound surrounding the nitrating house where some oil was recovered

1) The pre-washed oil of the operation (4) went through two vessels in series, each of them equipped with a stirrer, Simultaneously with the oil a' Pin sods ash

solution, measured by a rommeter, entered the vessels. There was no superation of the emulsion between these vessels, and the oil/sods emulsion went from them to an annex (wash-house), located outside the mound surrounding the nitrating-house.

Note: All the above listed operations were conducted in the nitrating house, It should be mentioned that the attrator was provided on the bottom with a glass place which could be broken when it was required to drown a charge. A posumatic hammer operated by a handle at the door of the building was used for breaking the glass. The drowning mak, located below the nitrator, contained about 5 times the volume of the sitrator of 95% sulfurie scid-

a) The emulsion from the previous operation went through two separators located in the west house. The separator oil was collected in a rubber lined aluminum truck. holding 600 kg, while the wash waters went vin a cuscade system to a tunnel leading to the Rhine River b) The truck coats Soutralized oil was emptied into a storage tank where it was allowed to stay for at

least one day to permit the water to separate. Note: la a newer type of final settling house, there were 6 Sianzi enasential lend separators placed in caucade and working continuously.

i) The dried oil was removed from the atorage tank as seeded, by mesas of beavy rubber buckers of 40 kg

The average yield of dry NG from the Bianzi blant was 232 parts by weight per 100 pts of dry glycerol. The etability was 14 minutes by the Abel Test at 81°. When the nitration acid was made from acids recovered from TNT manufacture, it was sometimes necessary (in order to obtain satisfactory exability for NG) to include from 0.1 to 0.2% of No autfire in the sods washing liquor. During the war, however, diphenylamine ambilitors were sometimes used when the quality of the NG was unuscialactory.

in the manufacture of double-base propellants, NG was used alone, while in the manufacture of commercial dynamics-type explosives it was used in mixtures with NGe (mitroslycol).

References

1) R.Escales, Nisroglyneria and Dynamit, Veit, Luipzie. (1906)

2) P.Naoues Nicroglyceris and Nicroglycerin Explosives. Williams & Wilkins, Baltimore, 1928) pp 25-178 & 210-239 3) A.Stenbacher, Schiene und Sprengemiffe, Barth, Lupuig, (1933), pp 146-172

4) O.W.Stickland et al. General Summary of Englosies Plants, PB Rept 925 (1945), pp 67-8

5) R.Asheroft et al., Investigation of German Commercial Explosives, BIOS, Final Rept 833, Item 3, HMSO,

London (1946), pp A 1/4 and A 2/4 6) A.Scertincher, Sprong- and Schienestoffe, Zurich (1948). Pb 19-62.

Hitrophycorin-Mitrocelluloss Emplosives, Commercial explosives suitable for blasting rocks were prepared by mixing double-base propellants (left as surplus after the termination of We I)-with other ingredients, such as inorganic nitrates and organic nitrocompounds.

Following are the compositions of some of these explosives: a) Mining Liar No 33 Explosive: NG 30 to 40, NC 60 to 70 . with added 0 to 5% of hitroderivatives of toluene (sod/or naphthalene) and 0 to 10% of parattin (and/or urethane, and/or centralite, and/or dicyendiamide)

b) Mining List No 35 Explosive: NG-NC jeile \$4 to \$6 and 4 to 6% of a 50% aqueous solution of Ca nitrate

c) Mining List No 36 Explosive: NG+NC jelly 97 to 99. and I to 3% of aubstituted urethanes. Raformnee a.

1) P.Naoum, Nitroglycesin etc., Baltimore (1928), pp 449-50 2) J.Pepin Lehalleur, Poudres, 472, Paris (1935), p 458.

Hitroglycarinsprengatelf (Nitroglycarin Explosive). See

Nitroglycoringulver (Nigraglycorin Propellant). A propellant based on NC and NG, siso called double-base propellant, Prenn and properties of typical-NG propellants are given in the book of A.Stettbacher, Speeng and Schiegastoffe. Zünch (1948), pp 41-43 See sino.under Propellance.

Nimosiykal (Nitrosiycoi), abbreviated in this book to NGe is described in the general section under Glycol. The manufacture of NGc in Germany was conducted in the same manner so for NG. Because of high volatility, it is not

advisable to use. NGc sions in explosive compositions (although the vermans sometimes did), but it is natisfactory to add NGc to NG in prefer to depress the freezing point of the latter. Such mixtures were used extensively in the preparation of commercial dynamics-type explosives. References: Same as under Nitrostyceria.

Mirroquanidin (Nigu) [Nitroguanidine (NGu)] described in the general section under Gunnidine was prepd in Germany by creating guaridine nitrace (GuN) with coner sulfuric acid as described by Schours (Ref 4). Briefly, the method was as follows:

In order to obtain 100 kg of NGu, 135 kg of GuN was added aradually to 300 kg of 98% sulfuric acid while stirring and cooling so that the temperature was not allowed to go above 45°. The resulting mixture was: run into a dilution wassel (maintained at 0°) in which the precipitation of the crude NGu took place. By using a centrifuge, the crude product was separated from the liquid phase which contained about 20% H 50. The coude material was dissolved in boiling water. mixed with the mother liquor from the previous ber a (see below), made exactly neutral by means of ance nin. filured and the filtrate cooled to at least 450 at low pressure. The resulting crystalline suspension was transferred by air pressure to a centrifuge, . This gave 1 purified NGs with a water robrest of abrat 6% and a nother liquor which was later used for dissolving the grade NGe of the next batch (see above 'Ref 4) The preparation of NGu was also described by Sterrbacher

(Ref 1)

### Uses of NGu:

A) According to Davis (Ref %, NGs in admission with Am nitrate and wax or partition was used during WW 1 for loading various bomba. These compositions were lastly insensitive to shork

B) During WW II NG- was used either in propellance such as the cool, erosionless and finabless triplebese propellant, salled Gudolpulver, or in explosive compositions.

Note: When intend d for use in propellants, the NGs crystals were required to be of such size and shape that when the ingredience of a propellant were rolled into sheets, the

incorporation was amouth and rapid. When intended for use in explosives, two kinds of NGu crystals were used: a) finest gain crystals (dust) obtained by rapidly evaporating a hot aqueous solution of NGu under high vacuum. These creatals were found to be suitable for press-loading b) crystals with high bulk density (above 1.0), obtained

by crysmilizing NGs in the presence of colloids: Fach crystals were found to be suitable for the cast-loading of TNT-NGu mixtures

C) As an example of the uses of NGu as a high explosive may be cited the 1800 kg AP bomb in which some NGu was placed in the none as a sort of protection (bumper) for the more sensitive mair charge consisting of "Filler 100"

Note: According to CIOS Rept 32 48 (1945), German preduction of NGu towards the end of WWH was about 1500 rons References:

1) A.Stettbacher, Nitrocellelose 7, 141-145(1936) (Nitroguamidia)

2) T.L. Davis, Army Occurance 20, 93 (1939) 3) PB Reat 925 (1945), pp '22 & F16

4) W.Schautr, PB Rept 16.665 (1945)

5) Allied and Enemy Explosives, Aberdeen Proving Ground, Md (2946), p 249

6) A.Senstir cher, Speenge und Schieseroffe (1948), p 44.

Mitrolasburylglyceriatriniren (Nitroisoburylglycerin Triattract) See general section and also A.Stettbacher, Sprengund Schiesemile, Zürich (1948), p 69.

Hitrel . See general section.

Mittelit. An amatol type explosive in which TNAns (trinitronnisole) was used to replaced TNT. The mixture of TNAne 60 and Am nigrate 40% was of light yellow color with a mp about 75° which permitted cast-loading, Its strength, brisance and amnitivity to mechanical action were similar to those of 40/60 Amatol. It was bygroscopic and in the presence of moisture the ThiAns hydrolyzed to pieric soid, which would attack metals with the formation of danacrous picrates, while the Am gitrate could bydrolyse to form ammonia. Nitrolis was used in some see mines and sprpedoes. Reference:

Allied & Enemy Explosives, Aberdeen Proving Ground, Md. (1946), pp 110-11.

Mitroparoffina. German revenich on the preparation and properties of nicroparaffins is described in CIOS Rept 33-41 (1945). See also general section under Paraffina.

Mitroponto (Np) . See Pentrit (PETN).

Nitropentaerythelt . See Pentrie .

Mitronvarke (Nicronterch) . See general section under Starch .

Mitrotaluel . See general section under Toluene .

Mitrous Oxide, N.C. Same as Git-1. See also general

Mitrosylol . See general section under hylene .

Mirrosoffelese . Some as Nizrocellulose.

Hitronweker (Nitroengar) . See general section under Sugar .

Nizol , see under Spine Section .

Negelis (Nobelite). A type of permissible gelatic-dynamites used before and after WW I. Two examples are given in Table 20

Composition (%) and some	Nobelite	Nobelize 19
NG (gelatinused with NC)	28.7	26.0
DNT		2.6
Deatrin	2.5	
♥ood mest	1.0	1.0
Potato flour	10.0	
Vegetable oil	.0.5	
Am nitrate	39.7	34.0
Am chloride	1.7.6	32.0
Saturated sola of Ca nitrate		5.0
Ozygen Salance,%		5.0
Denatty		1.75
Velocity of Deconstion, m/sec		3750
Trauzi Test, sc	270	220

(See also Wetter-Nobelit) References

1) P.Naoum, Schiese- und Sprengstoffe (1927), p.150 2) P.Neoum, Nitroglycenia (1928), p 407,

And Nobels' Sprengil oder Sprengil - Same as Nitroglycerin.

Nahels' Wetterdynamit I. One of the older permissible dynamites: NG 30, Ne nitrate 31, flour 30, wood meal 6, napshalene 3 and slum 1%. Veloc of detonation 3860 to 5930 m/sec at d 1.16 [ Mershall 2 (1917), p 492 ].

Nam-Destructive Testing of Meterials. Some of the German methods of testing are described in SIOS Final Rest 609 (1946). See also general section.

Hermeles Gesvalumen (Normal Gas Voltime), Voltime of gas at normal temperature (0° or 20° C) and normal pressure (760 mm) or Gas volume at NTP, Calculating of the volume of gas developed on explosion is described in the general section.

| See also A.Stettbacher, Spreng- vad Schieustoffe, Zürich (1948), pp. 13-14 1. . .

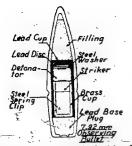
MSP. See under Imition.

NationNP, See under Imitton.

Oberflüchenbehendlung (Surface Treatment), See general section under Surface Treatment of Explosives, Propellante, Pyrotechnic Compositions, etc.

Obseen Geren. A device designed in 1944 for controlling the bursting point of the air-to-air incendiary rocket, R 100 BS. It was claimed that the Obsero device improved the chance of a serike from a negligible value to a probability of about 0.4. References TM 9-1985-2 (1953), p 255.

Observing Bullet, naliber 7.92 mm, developed by the Deutsche Waffen und Munitionsfabriken A-G., Lubeck, exploded with a flash on hitting the target. The bullet explosed with a liash on nitting the target, ins pointer consisted of a seed caring containing a charge of white phosphorus, a deconator and a striker with a steel spring. The base of the casing was closed with a lead plug. Reference: H.Peplos et al, CKS Rept 33-20 (1946), pp 26-7 (See drawing on next page).



Debegon, German name for Cyclatetromethylane Tatra-nitromina, (H.C.N.NO.), called by the British HMM. (His Majesty's Explosive or High Melting Explosive). (ris seasesty a Espiciave or ligh Melting Explosive).
This compound whe present as an imputely in Henogen
(RDX or Cyclonite) when prepared either by the Evyeriahren
or by the KA-Verlahren, it was found by the Germans that
Cetagen is more sensitive to friction than Hexagen, but is more stable to best.

Qienrehe (Stove Pipe). See under 88 mm Wenpons.

Difensivities oines Trethmirtels (Offensiveness of a Propellant). In order to be sure that a wespon (such as a rifle or cun) will not burst on firing, it is opcessory to anow the presence developed on compustion of the propellant and der mite of pressure increase (Gesehwindigkeit der Druckstriggrang). If any of these values are greater than calculated for a given weapon, the propellent is not suitable. Also, it must be certain that the combustion of a propellant will not develop into a deconation. The faster the rate of increase of pressure of a propellant the greater is the Offenniviter.

This property of a propellant may be judged from the following test:

Usual fixed charges of various propellants to be rested are fired in a weapon provided with a device for determining the gas pressure. The tests are repeated with charges increased 25% and then with charges increased 50%. Table 30 gives results of tests conducted by Brutierig (See below).

Palamaca N. Rrosswie. Das cauchlose Pulver. W. do Gruyper. Braunschweig (1926), pp 220-221.

Optolone. A liquid rocket fuel consisting of above 30% Visel, 10-70% unitine and the rest being properties of the 10-70% unitine and the rest being properties. Description of the 10-70% units of the 10-70% to that obtained when using Viscoi/nettic scud.
Reference: Gollin, ClOS Repe 28-36 (1945), p 19.

But adar PAK, Abbreviation of Panzembeehrkanoae, which means Antituck Cannon, or more literally Anti-Armor Defence Cannon.

Paletinel, Trade name for nilphetic outs-phihalic acid esters of the general formula CaHa (COO.C. Harmon) posed in 1927 by Noll. as plantetizets for NC. Patations were manufactured during WW II, by the I G Furbeniadustries and used in some propellants and explosives.

Following are examples of Palatinola:

Palerinel A. Diethylester of a-phthalic acid

Palatinal C(Elnui Dibutylenter of o-phthalit acid, d 1.0543 and b p 320°C

Paletinel HC. Di-iso-butylester of o-phthalia seid:

d 1.0490 and b p 305 m 315 Palatinat M. Dimethylester of a-phthalic acid.

Palatinola are practically non-volatile(en adventage over camphor) and do not become ranced in storage (so advantage over castor oil). Referencie:

1) W.Kraquich, Kunstoffe, Lebauan, Berlin (1943), o 40 2) Kast-Metz, Chenische Unternuchung der Spreng- und Zündstoffe, Vieweg, Braunschweig (1944), p 161.

Pantopoliti. A dynamice manufactured more than 50 years. ago at Opinden, near Köin: NG mixed with aspthalene 70, kieselguhr 20, Ba suifate 7 and chalk 3%. | Daniel, Dictionaire, Paris (1902), # 599 ].

20' 0

#### Table 30 (Offensivitat)

	` Sam	ple 1		Sample 2			Somple 3			
Chicges	Gas pressure (atm)	Press incre Atm	850		Gas Pressure. (atm.)	Pres incre Atm		Gas Pressure (stm)	Pres incre Atm	
Usual fixed- Increased 25% Increased 50%	620 1000 1160	380 160	61 16"		540 🦟 800 1040	260 240	48 30	400 890 1300	490 410	122 46

Note: Of the three samples the last has the highest Offensivitat because the perpensage increase in pressure is the greatest.

PANZER (Armor or Armed Vehicle) (In collaboration with Col G.B.Jarrett and Mr K.F.Kempl of Museum, Aberdeen Proving Ground, Md).

Under the term Panzer, the Germans included following armed vehicles:

a) Aufklörungspunzer (AufklPz). Light

commissance vehicles
b) Flowponzer (FiskPz), Special vehicle

almor cover; used as MA weapon

d) Punkingkpanger, Radio guided, light armored vehicle e) Funkpanzar. Acmored vehicle for troop radio communica-

with front lane support aircraft

f) Gepanzerte Munitionstransport Kampfwagen, Amored

O Geopenzerte Monitienstromport Komplewagen. Armored venacie for transporting ammunition. In belonged to the gj Josephunese (1 gil Pa), called alan Pancer läger (Pri ja), rank destoryer, taabh huner or pursus taak Li twas a highly mobile, lightly ammored and heavily armed or can't chassis and designed to catch up with sand destory onemy tanks. Like a tank it was able to leave nondways and manecure over tongh terms in

h) Ludsspanzer, Armored amphibious troop carrier.
i) Luftlendspanzer, Light armored vehicle used with

i) Munitionatronsport Kompiwagen. See Gepanzerte Munitionatronsport Kampiwagen k) Pangerbefehlawagen (PEBefWg) Commander's tank-

It carried a superstructure, a two-way radio and a minimum of armor and arms

1) Pargerbasbachtungswegen (Ps Beoveg). Armored can

1) Functions accounting aways (PS DOOR 2: Armore car one of the articlery aporting an Penaseripae. See Jagipan zer e.) Panaseriopee. See Jagipan zer e.) Panaseriopee (RpWg), called also Komphrogee (RpWg), Penaserwapen (PWG), called also Romphrogee (RpWg), Penaserwapen (PWG). also Respresses (Apire), emanwester i contact simply Penner, eas a bearent service a compiler special service and a compiler special service and a compiler special service and a compiler seed in organized frost line units for a spearhed. None: The first-tank was built during WW Up the British and used in September 1910 on the Somme. In order to keep Secret the construction of the new weapon, it was listed in shop orders as A water Carrier from Nessopotamis and this name was fater shortened to Inni Res 8)

so name was later abortered to jask (KET 8) of Pausakengéresen Floramenverier- Armond vehicle equipped with a flame thrower of Pausakennichtenstwasper Kampfwagen. See Gepanzette Musikasakenapyen Kempfwagen. See Gepanzette Musikasakenapyen (GP 991). Rapid, lightly armored vehicle for reconsultanapyen property of Pausakenapyen, See Paularkampfwagen (JP 91). Pausakengéré, Amoned cokate trojuctor et JP enger verfer, Amoned cokate trojuctor et auda visik Amored Infautur, eg to transport pausance

or ammunition

a) Salbartantiafette (SR or SR, Self-propelled artillery
consisting of gua mounts (gua carriages) which had their own motor power to carry them into combat. Each

mount could have protective armor and neary Caterplian treads to enable it to leave condensys and nanetwer over tough termin, it differed from Towed Gums w) Jamesenverfishreous (Solfiz). Any operialized vehicle, such as a tank, tank destroyer or sell-propelled nount, might be designated as Solfiz.

magnt to desagnated as SdKfs.

2) Showspancer (SauPa), called also Sturmpuschiffs.
(StaGeach). Front line support amoned webicles\_supplying overhead fire power's gainst infancy.

6-following -is\_a\_brief description of tasks development
is Germany before and during W II:

as termany before and during WW II:

Due to the restrictions imposed by the Treaty of
Vernallies (1919), the Germans did not have the sight to
build make. Nevertheless they by-passed the restrictions
and garred to build reaks as early as 1926, when Rheinmetall Co came out with a 21-ton tank armed with a 75 mm gun. In 1977-1928 the so-called Landwirtschofflicher Schlopper, abbreviated as LAS (Agricultural Tractor) was constructed, which by a clever arrangement, could be easily converted into a mark and this was later done. The resulting mark was designated as PzKpfw t or 5dKfz 101. its first variation (Model a), which appeared before the Spanish Civil War (1934), weighed 5.7 tons and had a man Spanish Civil War (1944), weighed 5.7 tons and had a man append of 25 mph, while it second variation (Model 5) weighed 6 tons and had a man append of 52 mph. Hoth models were appended of 52 mph. Hoth models were a man and had a man append of 52 mph. Hoth commander's near the first house the second of the commander's near the first house the commander's near the first house the fi

Saveral other tanks were constructed in the period Marienfelde; d) Henschel, Kassel and e) Rhesomerall, Düsselderf.

Dusseidort.

The lirst design project was a 10-too rank begun in 1934 out of which the PEKpfw II or 5dKpfx 121 was eventually developed. The handling of this project set the pattern for nearly all the casks developed up to about 1941, such as 30 - 2, 33-4, and even 60-t tasks (designed by themschel in 1937-1939), but they were never mass-produced.

Pakpiw II

The onginal tank, Pzkpiw II (Sdkia 121) weighed

about 11.5 tons and carried one 20 mm gun (either 2 cm KwK 30 or 2 cm Pak, 38) and one 7.92 mm MG, its mass speed was 30 mph. The mak "'s made in several modifica-

speed was 30 mph. The anh. "In made in several modifica-tions (a, b, c, f, g, g). Its consists was also used for a second of the second of the second of the second of the feature of the second of the second of the second designated 7.5 cm Put set of \$1 (Scide, 31) weight causied one 75 cm A/T gas pastern 40/2, 48 calibers and the second of the second of the second causing one second of the second of the second designated 7.62 cm Puk (r) and \$1 | April 28 (Scide, 13.20, Most Mendey 28 is described a mor find of this section

under Czech masse.

b) Self-propelled mount nicknamed Waspe (Wasp) and designated 10.5 cm iFH auf Sf ii (SdKiz 124).

and designated 10.5 cm IFH and SI I (SAKA 12.0) considered not 105 mm light however known as 10.5 cm IFH 18 Majorat vs 12.5 mms mas appeal 25 mph 15 mm of 1

speed 34 mps.

Recornais saace cank, nicknamed Luchs (Luchs) and designated as Aufhilp 11, IP 159 Well (SdKh123) carried one 20 mm gan (2 cm kwk. 38) and sase bld. Wt 13 tone and max speed 40 mpb.

Amough the design of Pakpfw III started several years before WW II, the tank did not reach the frost until 1941, laws than the Pakpfw IV. The tank III, was known in several modifications and some of them were equipper with cornion bar, suspension designed by Dr Porscha in general Pakpiw III was considered one of the most original and successful German tanks. About 6700 of them were produced between 1941 and 1943, most of them at the Daimler-Benn factory.

inler-Benz factory.

Following are the principal tank III versions as well
a flame thrower and self-propelled mounts utilizing

Pakpfw III chassis:
a) Pakpfw III (Models A.B.C.D & E) (Sdkfs 141) were tanks weighing 18 to 20 tons nimed with one 50 mm short barrel gun (5 cm KwK) and two MGs Mc

Max speed 28 molt b) PEKDW III (Models F, G & H) were tanks weighing about 25 tons and armed with one 50 mm short barrel Note: The above sun fixed a 4% lb shell at a mus vel of

Note: An array and the state of the state of

speed 28 inph.

Note: As the short gun of previous models proved to be inefficient against American medium tanks M5 (General Grant); it was replaced by a long gan (60 calibers long) which had a much higher much well. Model I marked To

(Tropen) was insulated against African desert heat.
d) PzKpfw III (Models L, M, N & O) were tanks weighd) PERFORM III (Models L. M. N & C) werk teaks weigh-ing about 24 tons and armed with two MGs 34 and one 75 mm gun (77,5 cm KwK) ot one 37 mm long bettel gun (3,7 cm KwK) 39, Mas speed 28 mph. a) Commanders cank, PaBetwg III (SdKrs 143) weighed 24,5 tons and carried a dummy 37 mm or 50 mm gun and two MGs which might also have been dummies. Mas speed 25 mph.

b) Flamethrower tank, Pakpiw III (F) or Panaerilama-wagen III. weighed 23.7 toon and carried one flame-thrower and two MGs 34. than apped 27 mph g) Antinicraft tank, nicknamed Kwashlita and designated

A antisiticati tasky acchanged Regulblisty and designants Phiappanes III, carried one 50 mm voin AA gan called 3 cm Flakaveiling & 103 cm Flakaveiling & 1

The work on the development of Pakpiw IV began at the Krupp plant as early as the summer of 1936 and the teak was actually used in the Polish\* (1939) and French

(1940) emopaign.

Fellowing are the versions of runh IV as well as the pall-open-pilled monomass utilizing channel of Pakpfer IV, personal of the pall-open-pilled monomass utilizing channel of the pall-open-pilled monomass utilizing channel of the pall-open-pilled pilled pall-open-pilled pilled 7.5 cm KwK L/48 for models F. 3 & K.

Notae: The 75 mm gus, -24 calibers long, fired a 15.5 lb shell with a velocity of 1650 i/s, while the 75 mm gus, -68 calibers long, fired the same shell with a velocity of

48 calipora 100g, nava use some nature was called a Josephonnos IV (1 gdDs c) Tanh destroyer designated as Josephonnos IV (1 gdDs T), Panaevinigue IV (Pajkg IV) or Sakkis 162, versioned about 26.5 come none carried either a 77 mm earsait gam, 40 calibors in on Sak 42, L/4d) on 75 mm, 40 calibors in on Sak 42, L/4d) on 75 mm seasant gam, 70 calibors long (7.5) cm Sak 42, L/4D). The exheunt weighted about 26.5 come and had a mass.

Note: This weapon was listed by G.B. Jarrett as a self-

specied mount.

2 J. S. cm. Pok. 43/1 auf PaKphw IV (SdKfs 164), nicknamed Herritise (Horset) consisted of an 88 mm A/T
gon on a pank IV chansis. Mass wel of the gan was
1281 I/s. The weepon \*served successfully at the
Russian front and was later \*redesignated in Nenhern

Reference care to be the service of the service care below [Research also ] S.A. cm Pak 43/1 and PajZg III/IV, designated also S.S. cm Pak and Si IV and alchanned Western (Rissocures) consisted of an SS am, A/T gain, 7/ cmilbers long on a tank IV chassis. The ensemble weighted 26 tons

a tank IV thasses. The ensemble weighted 20 toos and jir, dana speed was 22 mph. Notes: The gan of the Nashom fired a 22 lb. shell with a max vei of 3280 l/s. The gan is the Tiger II had the same musule velocity and used the same ammunation. Shoth the Housase and the Nashom were larged by G.B. Jarrett.

as self-propelled mounts g) Self-propelled mounts (Selbetfehrleferren IV, ab-breviated Sf), called also assault guns (Sturmposchütze)

stated in the following models:

1) 2 cm Flakvierling and Si IV, nicknamed Wirbelwind (Whitiwind) was a 20 mm four-barreled AA gun
on a took IV chassis. It was used since 1944
2) 3,7 cm Flak wil Si IV, nicknamed Obreind (East Wind) was a 37 mm AA gun ou a tank IV chassis, it was used since 1944

was used annew 1794 3) 10.5 cm Stull 42 L/12 and PxKpfw IV, designated also as 10.5 cm IFH 42 and St IV, consisted of a 105 mm light howitzer, 12 calibers long on a conditied tank IV chassis. It weighed 19.2 tons and had a

canh if Chassis. It wespect or a lot on the max speed of 25 mpb.

4) 15 cm Smil 4) (or 15 cm slG 33) and PzKpfw IV,
designated as SckKr 165, consisted of a 130 cm
medusa beavy infantry gun 35 on a tanh IV chassis,
it weighed 29 mos and had a max speed of 25 mpb.

It was also called Sturmponner 43 and nicknamed

5) 15cm sPH 12/1 auf PrEpfer III/IV. slno designated 15 cm sPH auf Sf IV (SdKfz 166), consisted of a 150 cm medium heavy bowitzer on cash III/IV chagas. It was suchnomed Museum (Bumble-Ber).

constants, it was decenoused recomment (Dausble-Beet).

No. 22 toos and may speed 2) supply to 22 toos are most speed 2) supply to 22 toos are most speed 2 to 22 toos are most speed as a summentation carriers. (Most interest speed and care of the units carried a crane and abelia, for heavy mortans Kept and Thor. (See Toos and Kall Mortans)

Thos and Kai Morato make were very spacessful in the invasion of Poland (1939), Belgrun, the filled and france (1940) has proved to be invadequent during the campaign in Russa (1941) when the heavest 10 register of the Cartina and Digerm was nectored (in 1941) by the Right Comment. That if the Cartina and Digerm was nectored (in 1941) by the Righ Comment. It was decided to develop anoth heavers models, \$z\$, 90 months of the Cartina and Digerm of the Cartin 100 Pakpiw II tenks

The first tank constructed under the new program was the Tiger i- (P) or Pikfelow VI (P) designed by Poncha, As it did not prove to be very successful as a tank, are chassis wise-modified-mod-used for the tank deputopers Profitmed and Estain (Elephank) (See below)

wurnesse and Elefant (Elephant) (See below) and description of the state of the sta

At about the sense period another heavy tank impore as Penther was developed and west into production early in 1943. This usek was introded to replace Peaser III as in 1945. Into that was introded to replace Publish its and Patase 1945 Tiger 8, on Patter 945 Tiger 8, on Patter 945 Tiger 8, on Patter 941 ED, gave rather inadequate settled at the flushum front Rade night of the tank was origined by the High Command in order to meet all the requirements of the front. The newly designed tank was called Tiger II or King Tiger (See

Following is the list of Panthers and Tigers: Punther (Pakpty V)

a) Basic model of the PaKofw V (SdK/s 171) Penthe weighed 47 tons and carried one 75 mm gas, passers 42 (7.5 cm KwK 42) and two MGs 34. It carried a 4" gas in the top frost, a 3" gas in the bottom frost and 2" gas at the sides. Man upted 30 mpb

Notes: The mak enjoyed immunity from most Allied pre-Neezs: The tank energed immonary from most Allied perjectules as far as in from was concerned, but he selder
as a far for was concerned, but he selder
a 15 in shell with a max vel of 3066 (No. The most extining
feature of this touch was the long frontal place similar
and the state of the long frontal place similar
pandars ware verseus with a canotic like paste, which
had a very verseus with a canotic like paste, which
had a very verseus with a canotic like paste, which
had a very verse was stated to the touchs, (soom misse were
magnetic minds sticking to the touchs, (soom misse were
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as a state of the st iections as far as its from was concerned, but the a

of some mechanica mirrors, in this time to the acceptant for service and preference was given as the mak Hawe I Porticle and preference who given as the mak Hawe I Porticle modified the chassis of his task and convented it to a self-propelled motor carriage known as Ferdimand, Palide VI Preference, Solfta 184, Japa Px VI (P) or Tiger Provache, it was equipped with one MG and one long-barreled 88 mm gun (3.8 cm KwK 35), very effective against armor. This mak destroyer mas supersached by Elebert (Elephann), designated as 3dKz 184s, which carried one MG and one BB mm A/T gun , 71 calibers long (8.8 cm Pak 45, L/71). The ensemble weighted shour 75 fone and had a max speed of 22 mph. Note: F. von Senger und Exterize (Ref 9, p. 192) called the above tank destroyer, the Jude's VI Aust Fersche, and gave

its properties as follows: wt 68.8 metric tons (about 75.6 short tons), max speed 35 km (22 mph) and it carried one 128 mm A/T gan, 55 calibers long (12.8 cm Pak, L/55)

c) Tiger II or Tiger 6 tank, designated PzKpfw VI (8) c) Tiper ii or Tiper ii ont Kigner in the King Tiper or Sekke 1821, called aiso Keinparinger (King Tiper or Royal Tiper), weeghed 75 ones, had a max appered of Jamph 71 calibora (see Sea 182), and one 88 mm pan 71 calibora (see Sea 182), and one 88 mm pan one 183 ones to the Sea 183 on designed for submecessor up to 1) ft nod all the 10 interwere made varieties of the same puber scale. It resembled
the Pischer in appearance but was larger and more
effective in performance. Although fits design was
performed by the 10 intermodered by the 10 interm

e) Jone Tiger or Tiger Jüger was a 77 ton tank destroyer. equipped with a 128 mm gun, 66 calibers long (12.8 cm Pak 44 or 12.8 cm PJK 44). Max speed 25 mph Past as or 12.6 cm FJE as, Mass speed 2 mpn ) Sawmeiger (Stumpagner VI mis 36 cm Münsch), called also Stummabree, was a self-propelled mount consisting of a 360 mm Rocket Projector (36 cm Raketenwerler d) mounted on a Tier E chassis, if "wighted 68 cons

During Forld Wer L. L. Seen, years also used some Casch makes, seen, on the Toda Germans also used some Casch makes, seen, on the Toda Germans also used to the Pilese. The original model, built before by Scholler and Scholler

carried a flame thrower in lieu of a gun. Other T-38 versions, served as self-propelled mounts; the first SP mount, designated 15 cm siG 33/1 set Prkpiw 38(t), carried a designated 15 om site 33/1 out Frapre 38(1), carried a 150 mm medium heavy infanty gus (how sizer) 33/1, the second, designated 2 om Fish out Fragier 38(1), carried a 20 mm AR que, south desired, archamed frapred 38 (Marten 50), extended in even modifications one, designated 54Kin 50, extended in even modifications one, designated 54Kin 189, while the opportunities of the second of the secon is briefly described above under Pakpfw II. Some of the French tanks, such as the Lorraine, Renault,

Hoschkien, and Char B served as gun carriers. One of the forceign tanks used by the Germans was the Swedish Landsworks (L.40), designed by Serms. The cank was baild during you in a company of the Germans was the cank was baild during you in a too dopped (Ref. pp. 110-115). There were also many wheeled armored cars built in Germany. Some information about them in given by

acrett (Ref 7, p 116). Several Experimental Tanks other than those previously mentioned and also cank destroyers were designed by the

mans, but some of them was put info production.
Following is a partial list of these vehicles:
a) Lespard (Leopard). A 28-ton tank developed in 1942

at Dannier-Benn plant (Ref 5, p. 10)
b) Mous (Mouse) A 100-ton tank developed in 1942
b) Mous (Mouse) A 100-ton tank developed in 1942
b) Potsahe at Nibelungen berke. It was equipped
none 195 and Control of the same plant per (P) and cannied
(Ref 5, pp. 11-15). several Mids and a flame thrower,
(Ref 5, pp. 11-15). several Mids and a flame thrower,
(Ref 5, pp. 11-15) to no. developed in 1942 by Krupp Co.

150- and 170 ton, developed in 1942 by Krupp Co. (Ref 4, p 6) (Act a and b) ... In the court of the court

(Nels and 3).

\*\*Bår (Bear) was a 100-ton tank which carried a 503 mm one-cell-landing mortar (not recket type) (Ref 4, p 6) n).

\*\*Sp0-ton tank mounting as 800, om gun as august to 100 mm gun as 10

45 degrees (Ref 4, p 6).

References:
1) Anon, Field Artillery Journal, 34, 368-9 (1944)
2) G.B. Jarrett, Ibid, 35, 434 (1945)
3) CIOS Rept 23-1 (1946) Development of "E" Tank
4) CIOS Rept 29-22 (1946) History of German Tank Develop-

5) CIOS Rept 32-33 (1946), Tank, Development at the Daimle Benz Factory

Denz yaccory

O ClOS Rept 32-35 (1946) Development of New Series of
German Tanks up to End of March 1945

O C.D. Jacreta. Arching Paneer. The Story of German Tanks

O C.D. Jacreta. Arching Paneer. The Story of German Tanks

Merrian—Webster Tank Daks, RD 1, Aberticen Md (1948)

Merrian—Webster Merrian—Webster, Merrian—Webster, Merrian—

Extinctly Merrian—Webster, Merrian—

Extinctly Merrian—Webster, Merrian—

Extinctly Merrian—Webster (1988)

Co, Springlield Mass (1951), p 2577

9) Dr F. w' Senger u Etterlia, Tauchenbuch der Panner 1943-1954, Lehmanna Veriag, München (1954).

Ponzurfaust (Armored Fist), A hollow charge antitual rocket prenace lited from a tubular discharger, its smaller model Ponzurfaust 30 libele, was formetly called Fausapatrons 1 and its larger model Ponzurfaust 30 was called Pousaparens 2. The latear models were Ponzurfaust 60 and Persertment 100 (See also 44.5 mm Recoilless Gennade Discharger, under Wespons and also Faustpatrone ).



Pennsequentry Page (Atmorphiccing Projectile; Antisank Shell), Many types of such projectiles are listed under Geanate and described in TM 9-1985-3 (1953).

Benides the conventional types of AP projectiles, and projectiles with hollow (shaped) charges, the Germans used some Sabot projectiles such as Type G Sabot Projectile (p 367) and the 75/88 mm-Brand Sabot Projectile, developed (P 307) and the 7788 mm-Brand Sabot Projectile, developed by the French establishment of Edgar Brand, Nove effective were the Arrowhead Typs Projectiles with a Tungsten Catibide Core such set 2.8-2.0 cm Pzgr used in Tapered Bore Jun PzB 41 (p 57%), 3.7 cm PzgrPztr 40 used in CE 1,7 cm Pak(p 373), 4.2-2.8 cm PagrPatr used in Tapered Bore Gun LPak 4(tp 57), 4.2-2.6 cm PagrPak used in ispeced Bore Gun LPak 4(tp 57), 4.7 cm PagrPak 40 used in Casch guns 4.7 cm Pak(t) and 4.7 cm K 56(tK) 175), 5 cm PagrPar 40 used in Tank guns 5 cm Kwk 5 cm Kwk 39 and in A/T Gun 7.3 cm Pak 36(p 376), 7.5 cm PagrPar 41 used in A/T Gun, 7.5 cm Pak 4(tp 378). Sull more effective were Arrow of reasons type re-porting designed by O.Gesselverd at the Rickling Plant. The projections seemed at the Rickling Plant. The projections of the Rickling Plant. See also called Arrow Projection. Arrowhead Projection. Gramm. Grammer Projection, Rickling Projection and Sabor-Pingicellan).

Penzerhandning. Sen under Hafthobilladung.

Pannerschnelimine - See under Landminen and also p 262 of TM 9-1983-2"(1953).

Pennerschroek, Pennerfeint, Pannerscheftenane und Pieuchen were the shaped charge weapons developed before and during WW II in Germany.

The Panzerschreck was the shaped charge rocker similar to the American Basocks, but was benvior and had a shorter range than the letter. It was superseded by the Passerfacet, which was a better weapon with a unite of 150 mesers: Apother weapon, called the Pippehen, was essentially the &\$ cm Panzerschmek mounted on a lishe carriage. The Pannerwirthnoone was a long-range weapon for shooting a shaped charge, developed by the Rheinmetall Co. it was a smooth-bore 8.0 cm mortac. (Not also under 80 mm and 86 mm Veryons).

Referencess

1) L.E.Simon, German Resherch in WW II, Wiley, NY (1917), pp 187-8 2) A.Stettbacher, Spreng- und Schlesamife, Raucher, Zürich (1948), p 134,

Pensarwarler 42. See under Rechet Launchers. Penzerusificanene . See under Panzeruchreck.

Put nervoriance (IL): A shaped charge hand greenes, introduced by me Lativities for use in close combat against amooned vehicles of all offers in the control of the contro projectile in flight.

1) A.J. Dere, Ordnance Sergennt, Oct 1945, p 8 2) Anon, Intelligence Bulletin J, No 7 (1945).



Poppmine. See under Landminen and also on p 261 of TN 9-1985-2 (1953).

Perochute Flore. See under Flaze.

Parameon-Mixture of Am perchtorage 90 and paralita 10% used for military purposes. [ A Scottbacker Sacone- und Schiesucoffe, Zürich (1948), p 91 1

Publisher Combing. A night bushing metic developed during WW.II in Great Sricais and used against the Germand. The nexts consisted of dropping bombs on a magar-per-viously illuminated by flares dropped from the leading

This method numbered more accurate banking of the server Reference: A.S.Schilling of Picariany Arnenal; pocommunication (1935).

(See also Pyrotechnic Antipathfinder Devices).

Parrana, o See Cartridge

PC 1400 FX was a indio controlled glider bomb, released from averalt and designed for attack against region indipe or smaller objects. [ TM 9-1985-2 (1973), pp 1976 ].

Pronominds A meker sesserch conter, seclading as air manel, constructed in 1936-1937 in an included and an the German Baltic coast. The first mokes developed or Preneminds was the A-), the predecessor of the A-4 Rocket. commonly known V-2.

A fairly detailed description of Poeneminde Rockel Center and its activities in given in Ref 4. Personned is now in the Eastern Zone of Germane.

References: 1) A.Ducrocq Les Armes Secrites Allemendes, Paris (1947), po 103-110 2) L.E.Simon, German Research, in WW II. Witer, M !

(1947) pp 33 & 130 .1) L.G. Tuchinkel, Chew Eng News 22-2582 (1954)

4) W.Domberger, V-2, Viking, N.Y (1954).

Penro . Same as Peault (PETN).

Postuntit . See Swine nection.

Postul oder Pentritul corresponds to the American Penculite, described in the general section, (See also Fillers Nos 16, 17, 28, 42 and under Pretrit).

Pontrinit . See under Swise Explosives.

Pontrit adar Hitraponto (HP)- See greeni neccios under-Pentneryskritolsereneitrate (PETN), it was magnifectured in Germany by batch, continuous or semi-continuous mechada. A) The batch method was essentially the same as that used in the HS A

B) The continuous method, as conducted at Trojudori Fabrik, DA-G consisted essentially of the following operations:

a) Nitric acid of the highest concentration and PE in the ratio of 5 to 1 were introduced simultaneously into a nitrator of 54 liter capacity. The PE was added by means of a "dosing" machine feeding at the rate w 600 g every 47 seconds. The temperature was maintained at 15-20 by means of cooling coils

o) The solution-suspension of PETN in sitric soid was led to an after nitrator, where the mixture was main-tained at 12

c) After this it went to a third vessel, where a strong iet of water diluted the solid and precipitated that part of PETN, which was dissolved in the stronger acid d) The slurry was run through a vacuum filter and the ppt was rinsed several times with water

Ger 128

e) The precipitate was transferred to vessel where it was bresed in dilute sods ash role to 80-850 from which PETN was not so a 2nd suchiliver

f) After separating the ligher by vacuum fixmuor, the PETN was washed with water and aspirated to a moterure concent of 7-10%

g) The moier material was dissolved in 98% accrone -prehensed to 56°, and allowed to run gradually and with stimms into a vessel containing cold water b). The accross was distilled off and the covarallized PETN separated from the bulk of the water by vacuum. It was then packed in subber bags and carried to the phiegnatizing house

i) For phicamatizing (descriptions) PETN, the Trossdoct Fobrik, DA-G uned either Montan Wax; or a synthetic I G Wax - 41s. The amount of wax added to PETN was usually 10%, although mixtures with as " high as 60% were known. The cryamia of PETN were suspended in cold water containing some common sale in solution. The temperature was caused to about 40 and molten was was added, in a thin stream. The temperature was enisted and the mass maintained at the boiling point until about 20% of the water had evennessed

i) The slurry was then cooled for adding cold waited and filtered. After washing the phile matized product with water and removing as stuck water as possible by section, the product was dried to reduce the moisture content to below 0.1%. The material was then acceened and packed

C) The semi-continuous method as practiced at the Krimmel Fabrik, D A -G was essentially-as follows:

a) The nitrating apparatus consisted of 3 stainles steel vessels connected in series. A charge of 200 kg nitrate in the general section. of PE and 1000 kg of 99% nitric acid-was fed into the first sittetor (which was cooled with bring circulated is coils and in a jacker) where the eats airration cost place at 15-20 during about 10-15 minutes. A second charge of PE and HNO, was meanwhile weighed and transferred to the first nitrator immediately after the lat batch was transferred to the 2nd nitrator (which was also provided with jacker cooling). Following this, " the let barch was transferred to the 3rd nitrator, the 2nd batch to the 2nd nitrator, and a 3rd charge was introduced into the 1st nitrator, esc. The total time of nieration was about 40 minutes

b) In the 3rd nicrator, the mixture was diluted with water to give a waste acid of about -30% attempth c) After filtering off PETN from waste acid, PETN was washed with water and then digrated with node and solution in a stabilizing vesuel at 60° until the slarry was weakly alkaline (cime, about 1% hours). This was

followed by water washing directly on the filters d) The next operation, crystallization from acrees was done in a continuous manner in a battery of 6 distillation vessels connected in series. In these vessels, water was added to the solution and the acutous gradually evaporated leaving a water slurry of PETN. After removing the bulk of the water by vacuum filtration. the moist PETN (10% H.O) was transferred to the was phiamaciaes

e) Phiegontization was carried out in a water slurry of 315 kg of PETN (contg 10% H O) plus 1200 kg of water at 83°, to which wax, usually Montan or I G Wax -the. in the proportion of I part was to 9 parts PETN by dry weight, was added with stirring

Note: According to German Rathroad regulations, phieg matined PETN was permitted to be shipped if it contained at least 6% wax. Unphlegmatized PETN required at least 10% of water for shipping.

PETN was also phiegmatized by the addition of TNT (20 to 50%) and the operation was conducted by suspending PETN in about 6 parts of water at 70, heating to about 80° and adding molten INI with agitation. This was followed by cooling, filtering and drying. The mixture was sllowed to be shipped dry (Ref 1).

The manufacture of phicemetized PETN at the Wolfrage hausen Plant was deactibed by Swanson Ref 3 and CIOS Rept 25-16 (1945), Abbreviations: PE Pentaerythritol.

References: Same as under Pentritupmenestoffe.

Pentritagramentelle (Pentagrithrital Tetranistate Explosives). Straight Pentrit (PETN) was used under the name of Filler No 3-NP as a bursting charge in some grenades and small shells (such as the 20 to 50 mm), as well as in a lower detonator. Straight PETN was also used to a propellent

The use of PETN desensitized with 8-10% wax was much book common. Note. The wax used in German explosives was sepath-

Montan Wax, obtained from the lignifes found in many pass of Germany and countries securited by her dering WW II. The properties of Montan wax are comparable to those of Camanba wax imported from Brazil, German PhTNiway mixtures were usually dyed pink. The explosive properties of such mixtures were the same as those of the corresponding American minutes described under Pentserythrical Term

The principal uses of PETN-wax mixtures were an follows: fiflers for various shells, bombs, granades, and some sea mines; fillers in some shaped charge ammunicion; standard boosters in chemical and incendiary ammunition: attandard sub-booster in all types of emministion and as the core in a detonation fuer.

Explosives, desensitized with TNT, are briefly described under Pentol or Pentricol as well as Fillers Nos 16, 18, 28, 32-14, 36, 37, 42 etc.), In some mixtures Al was incorpotated and these were used in underwater amountains. Besides these mixtures there was also a piantic

emblasive (see Filler No 43) and explosives consisting of PETN, RDX and wax (See Filler No 45). References 1) Anon, Affried and Enemy Explosives, Aberdeen Province

Ground, Md. (1946) pp 138-142

2) O. V. Stickland et al, General Summary of Explosive Plants, PB Rept No 925 (1945), pp 42-45 A. A. Swannon of al. Manufacture of Phicamatized PETN.

PB Rept No 320 (1945) 4) A.Stertbacher, Spreng- und Schiessmife, Zürich (1948), pp

Pontritul ader Pontal (Pentalite). See general section and also under Petitrit.

Perchierate Explosives. See Perchipenteprengatolie.

Perchloratit (Perchlorative). A type of industrial explosive based on perchiomers. Table 31 gives some perchlometicus listed in the book of Naoim (Ref 1).

Specification (Ref. 2) lists the following perchlorations

T-13- 22

	Per	Porchlorations					
Composition, %	1	. 3	3	]			
K perchleruse	68	35	34	ŀ			
Am piersee	16	42	48	ı			
TNT and DNY	1 -	14	-	ı			
DNT	16	- 0	/12	l			
Wood (or vegemble) meal	1 1	- Feb.	4 6	ŀ			
NG (aitroglyceria)	4	41		ŀ			
MNN (mesonitronsphehafene)	1		100	Ī.			

#### References.

Pendit.

with nitrocallulose

- 1) P.Naoda, Nitrogiveeria etc., Baltimore (1928) 3 431 2) A.Scembacher, Schiene- und Sprangenoffe, Leipnig (1935). p 316.
- Perchloratelejinaprangatoff (Perchloruse Explosive Trench Mases). According to F. Naoum Schieses and Sprenge anolie (1927), p 133, the following castable mixture, develoced during WW I as Zentralamille für winnenschaftlichtechnische Untersuclingen in Neubabelaberg, was found to be suitable for use in Vertainen (mench mortare): K perchlorace 56, DNB 32 and DNN 12% and Note: This explosive was called Perdit by Davis (1943). p 364, but on p 118 Nacion gives a different formulation for
- Perahleratsprengetoffe (Parchlomas Explosives), Explosives based on the perchlorates of ammonium, potassisse or nodium were used to a limited extent in Germany, as fortastance : Parameos, Perchlocatite, Perchlocit, Perdit.

(See also Perchlorate Explosives in the general section). Note: According to Davis p 364 the perchlorates recovered from surplus bombs etc of WW I (nee Perchlorarminen sprengstoffe and also Perdit) were used in the German poor

WW I commercial explosives, such as Perchlemeit, Perchlorit. Perkeronis and Persalit. When the supply of surplus perchlorates became exhausted the manufacture of near-blasrate explosives was nearly discontinued because the price of new perchiorates was too high.

Parchiert (Perchiertes). A type of perchierte explosive aned in mining before and duting WW L Table 35 given the composition of two perchloritae

1440 00			
Ingredients and properties	Composition		
E perchiome An alerate DNT* DNN Wood neal Coal pender NG	35 42 10 4 3	34. 48 10 0 6	
Coypen Balance, % Trauxi Tare, eq	+1.7	+1.7 340	

"DNT was proped by the surrating of m-MNT.

Reference: Nanum, Nimugiyeerin, Baltimore (1926), p 135.

Perceronit' (Perceronice) ...A blessing explosive which perplaced Commit in small quarries and are mines: E' perchlorate 65, NG 5, aromatic nicrocompounds 25 and vacotable ment 5%.

Reference! [.Bebie, Manual of Explosives, Macmillan. N Y (1943), p 116.

Pordit (Ferdise). An explosive developed during We I as s replacement for the Corps of Engineers Explosive, (Pioneemmition) Donnie. The composition and properties of Peptit weger Am nitrate 72, K perchlorate 10, wood ment 3 and a supervise miscure of DNT and TNT 15%; density 1.20-1.25. Thund hest value 370-380cc, sensitivity to initiation organized at least a No 3 cap for detonation.

If was used not only as a descrition charge but also for loading Sombe and treach moress shells.

1) P. Naoda, Schiese- und Sprengstoffe, Drenden (1927), p 116 Il A.Scettbacher, Schiege- and Sprengstoffe, Leipzig (1933).

(See Note under Perchloramineaspres accoffe).

Perharent (Percoronite). A type of mining explosive manufactured after. Mg I from K perchlorate recovered from surplus military explosives. Table 34 gives one examples. (See next page).

Fermentt (Permonite). A type of mining explosive me utactused before WW 1 by the Spreagetoff A -G Carboni-One such explosive, called Gesteins-Permonic, was described in this vection under Coursingsprengstoffer. Table 55 gives two examples of permonites. (See next page).

(Percoroaites)						
Composints and Properties	1	2	l			
K perchiorate	18	59	l			
Am mitrate		10	ı			
DNT + TNT + vegetable meal	30	32	ı			
NG (nitsoglyceria)	4	"	ļ			
Oxygen Balance, %	+2.2	+1.8	l			
Deasity	1.58	1.52	١			
Velocity of Detoention, m/sec	5000	4400	ı			
Treasl Test, cc	340	330				
Pb Block Crushing, mm	20.0	18.0				
Requires for initiation minimum	No 3 cap	No 3 cap				
Gup Tees, cm	6.0	4.0	ı			
liest of Explosion, kcal/kg	1170	1160	ı			
Temperature of Explosion, OC	3145	31.15	ı			

Reinvescent

1) P.Nacem, Histoglycerie, etc. Baltimore (1928), p 430 2) T.L.Davis, Chemistry of Powder and Explosives, Viley, N Y (1945), pp 364-5.

(Patno	nrecs)	
Composents and Properties	1	2
E perchlorate Ass attrage NG Collosion cotron TNT Starch Tool mes Balances	32.5 42.5 10.0 12.0 3.0	31-34 59-43 3-7 3-7 3-9 13-3-3 13-3-3 0-2-3
Veloc of Detoantion, m/sec Density Trankl Test, cc Gap Test, cm Impact Seasisivity (2kg weight)	3780 1.23	365 8.0 20 cm

Personites were used in potast and in our mines. Some permonitus were on the British Permitted List and on de Belleine SGP Lint. References A.Marshall, Esploaives, London, v 1 (1917).

a 384 and v 2 (1917), p 493.

Persolit (Persolite). One of the perchlorate mining explosives manufactured from left-over stocks of WV I military explosives. The name Persalit is mentioned in P.Naoun. Schless- und Sprengstoffe (1927), p 126, but the composition is not given.

Petroliustit adar Heiklantit. Openf the pre-by f explosives used in potash mines and stone quarries; No aitrace 69. K mittage 3, unifue 10, cont one purch 15 and X highromers city, Tomazi Tear value 157 cc (vs black powder 108) and Sensitivity to impact with a 2 kg wt 100 cm (black powder 69Y

1) A.Marshall, Explosives, London I (1917), p 89

2) A.Sorebacher, Schlene- und Spreugstoffe, Leipzig (1933),

Ger 130

PETN. See Pentrit.

PE-Wells-A aitrocellulose of 11.25-11.50% aitrogen content used for the manuf of some amokeless propellants. See Nitrocelluloses and also Propellants .

Pfellgaschess . See Arrow Projectile.

Phononthree (Phononthrene) was proposed by Romer to be used as one of the ingredients in explosives based on cvclorrimethylenetrinstrosamine . (R-Salz), such as : R-Salz 96.5, phensathrene 2.5, and DPhA 1.0%. Reference: G.Romer, Report on Explosives, PBL Rept No. 85,160 (1946), pp. 10-13.

Phonia Sprangstoffe (Phonia Explosives) were mining

explosives patented to 1899 by the Squengaroliwerke Dr Nahosen & Co in Hamburg.

Table 36 gives some examples

Ingradience '	Composition 76									
	1	2	3	1.4	15					
NG E nitram	. 25	25	30	30	30					
Na sicrate Saudust Rya flour	40	35	32 38	30 40	32					
		1 40	<del></del>		1 38					

- 1) Daniel, Dictionnaire, des Mittieres Embosives, Paris (1902), p 449 2) L.Gody, Ttaité des Matières Explosives, Names (1907). p

Phonel (Phonel). See general section and also BIOS Final Rest 1746 (1946).

Phesphorus Sembs, Some incendiary bombs contained phosphorus. For instance, the 50 kg Brand C508 bomb contained white phosphorus whereas the 50 kg Brand C50A bomb was filled with 30 by of a makeure postulating phosphorus 4, bennene 86 and pure ruber 10%. Reference: IM 9-1985-2 (1953), pp 54-5.

Phosphorus Gronode. One of the incendiary grenades manufal Phesphene Greenest. One of the increditry greenden amound during We III. Germany was described in SIGS Final and Green and Gre

Photo Rash Bomb (Blitzlichteylindrische Bombe, abbrevinted as BLC or BIC), called also Photographic Flash Bomb. German bombs were similer in external appearance to con-ventional 50 kg bombs and parachute flare cases. Their fillings, which could be either flare compositions of incendiary mixtures, were taniful by electrical or mechanical aerial burgt fuzes.

rial burt fuere.

Following sure examples of photoflash bombs:

\*\*BLC-30 bomb weighed 30 ib and resembled in appearance the 52 kg 17pri 10mps except, that the case presented the 52 kg 17pri 10mps except, that the case body diameter 75%, body length 16.4 and crossest length 45,0°C for also ander 50%, body length 16.4 and crossest length 45,0°C for also ander 50% in 15 kg 18 kg

concrete which acted as a ballast to afailible, the flight of the book. The sucte section of the book to-chained 15 kg of 4 Pyroschild (q v), while the immediated 15 kg of 4 Pyroschild (q v), while the immediate property of the section of the succession of the suc concrete which acted us a failest to stabilize the

Photoflock Compositions. Among the compositions used by the Germans, may be gentioned the ones used in the BLC 50/A bombs.

C 50/A bombs
n) 15 is of finited eleminum, called Pyrosphilff (q v ),
lz was immensity to buller supact and had the following
characteristical peak ingle memority 450 million before
candled, time to reach peak massimity 70 millionecode
and potal light output 65 million learnmented condite

and notal high course 50 millions harmonous candid and notal high course 50 million harmonous called Gross 64 v), he was insensitive so builet sepact not had a peak light insensitive so builet sepact not had a peak light insensitive and 50 million floher endfast. The time of the control of

PH-Sain (PH-Sait), German name for Ethylenediaminadinitrote (EDDN), described in the general section, in Germany PH-Sale was prend by treating subviscedichloride with amounts and NaOH, followed by attraction with attric acid not arroager than 50%. Although PH-Galz has a high m.p. (185°), it has the property of depressing the mp of other high is p compounds. For this reason, the Germons used it to obtain tastable explosive aixtures. For instance. a minute of 45% PH-Sala and 55% Am nitrate meles at 105" and can be exer-loaded. Such a mixture ban an explosive power equal so that of TNT or Amazol, but it has the 'disadvantage of shrinking considerably on cooling. Addition of squeous Ca nitrare so this misture practically chminates shrinkage and maulta in a very good cour. The following mixtures coorg PH-Sala were used for filling some shells as a substitute for TNT.

n) Ammonite NH NO; 46, PH-Sale 46 and Ca(NO) -4H\_O(tech) B%; density of iragman m 39-40 m. Gen Fragments Density Tout) -

b) Ammonatt NH NO 55, PH-Suiz 10, Ca(NO) 441 O 10, RDX 20, and NaNO 5%; d 1.53, casting semp 106, density of fragments 40 m (Ref 3)

e) H-5 (Ammonit): PH-Saiz 10, NH NO 50, NaNO 5, Ca(NO ) 4H O 15, and RDX 20% (Ref 2) d) 5-16: PH-Sala 10, NH NO 32, NaNO 6 or 8, KNO

2 or 0, HDY 18 and Al (powder) 40% (Ref 2) a) S-22 (Heso): PN-Sals 14, NH NO 45, NaNO 9, ENO 3, RDX 14, and Al (powder) \$5% (Ref 2) f) \$-22 (Hexa): PH-Sala 14, NH NO 45, NANO 9, RNO 3, HNDPhA 14, and Al (powder) 15% (Red 2)

g) Amond 41: NH NO 52, PH-Sala 30, Ca(NO) -4H O 6.RDX in and Montan was 2% (Ref 3).

Compositions containing Al were particularly suimble for underways weapons because they possessed high blass effect. PH-Sals could also be used arraight or slightly phlesmatized, in the latter case, it was particularly suitable for use in anticoncrete abella, called Be-Granate (Be in the abbreviation for Beton sconcrete).

Befrances 1) PB Rept No 925 (1945), p 24

2) PB Rept No 1820 (1945), p 29 3) PBL Rept No 83 160 (1946), p 23.

Plante Acid . See Pikrins Zure.

Pleating or Ponatration Yest. For this cost as explosive enclosed in an iron tube, 50 mm in diameter and 100 mm long with walls 3.5 mm thick, was decounted decisiontally against a lead sheet 30 mm thick with sides 100 am long. The penetration produced was compared with that of a steadard explosive such as TNT.

References G.Römer, PBL Rept 85160 (1946), p 10.

Pike (Heals) Missile. An experimental guided missile developed in 1941 by the Rheismotall-Bornig Co. Reference: K.V.Gatfand, Development of the Guided Missile, London, 1952), pp 316-17.

Pfleteniere (Picric Acid) (P A ). Methods of preparation and properties are given in the general section, it would be of interest to know that in 1892 the Chemische Fabrik Griesheim, Ger, Pat 69 837, developed a unique process for loading till shells with P A. This was carried out as follows: a mixture of P A and 5 to 10% of TNT was placed in a suitable mold which was heated for a short time to a temperature of about 82°C which is slightly above the mp of THT. On cooling there was formed a solid block consisting of crystals of P A consued to the thin intermediate layers of solid TNT. In place of TNT other solid 

During WW II P A was manufactured for use as a seter (compressed), as well as a filler for some shells. land since, depth.,charges (see Filler No 2) and as a filler in stick hand grunndes (see Filler No 5).

Cast P A was used under the name of Filler No 24-Abbreviationa: DNS Dinitrobenzene; DNCra Dinitrocrandi; Diff's Dinitrophenel; DMY Dinitrophene; TNCrs Trinitrocread and THT Trinitrotologue.

I) E. de W. Colver, High Explosives, Van Nestrand, N Y. (1918), pp 319-20 a 697 2) Annu, Allied and Enemy Espionives, Aberdeen Proving

Ground, Md. (1946) 3) A.Southacher, Sprong- and Schlenoueffe, Raucher, Zlieich (1948), pp 75-77.

Pffeit . San Silvie.

Pires (Pirate). A solid peopellent socket used as an assisted take-off unit for Feueriffic -55. [TM 9-1985-2 (1953), p 226].

Pistel (Pistole). See under Wespons.

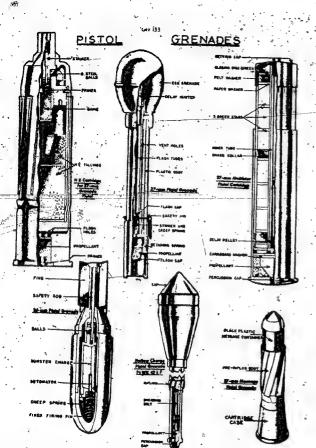
Pistoloopulver (Pistol Propellent). The following composition is given in Brunswig, Das rauchiose Pulver, (1926) p 136: guncotton 96, Ba nitrate 1. DPhA 1.5, residual volatile gelatinizer 0.5 and mointure 17.

Pinted Grenodes (Pintolengramaten). Several types of Garman grenades were fired from special pistols, such as the 27 mm Watther signal pistol, etc.

Gebnan greander, were fire? from servial pizzla, such as the? me within expan justed, etc., as the? me within expan justed, etc., as the pizzla with the pizzla within the piz

The second particles of the steel particles of the steel particles of the second particles of the seco pin (pp 342-3) d) 27 mm HE

inner cases be more interest and settlee the litted tigning of 12 mm Hz Geenade (Spreagpatrone) for the right plannel (Kamplpiatode) consisted of a die cast theminen body provided on the oasiele with five provers making me crylinder of the settlement of the provided on the case of the consistency of the crylinder containing two PETN/was, publicts appetrated by a cardivated time. The non-activities of the cardivated time. The case activity consistent band. The halfs which reserve in the provided striker band. The halfs which reserve in the provided on three limitaries which was assported on three limitaries of the limitarie the gains and trage was constanted as a sur space. The propellent strage was constanted as a cup which was placed in the Cattridge attached to the tail section of the gements. There were 10 holes in the cup to isad the propellent gazes to the base of the greende. On firing, the passe propelled the greended not rotated it because of the 'lifting. The nethack caused the collar in the fuse to move back crushing the aluminum pine and the contribust jours caused



the balls to fly outward. This partiy freed the surker, but it still was held by the creep sprang until the archer head his a solid object (pp 545-4)

23 mm Hollow Charge Signal Pistol Grenade, PEWK LP (Pannerwurfkörper 42 für Leuchmistole) wes (tred from the 27 mm Walther signal pistol fitted with a 23 mm rifled liner, a special sight and a folding but. The waters of the gleende was pear-shaped and contained the shaped charge and as impact cap. To the rear of the warbend was attached the tube containing the gaze fure-denoistic and the gaine. A short length of this tube was practiled. A thorner bab commissing a shearing hole, propelling and a necessary conmining a shearing bolt, propellant and a percussion cap was attached by a shear pin to the pictified section. On firing, the propellent games drove the shearing boil forward causing it to been the shear pin. This released the menade and armed the graze fuze (by serback) (pp 344-5) 27. mm Pistol Geenade Massage was fired from a 27 mm ti fled wignal pistal (Kampfpistole). The round committed of a position a alumnom cylinder (continuing a smoke generator. a .colored silk streamer and an ejection charge), a black plastic head (contaming a message or other small object) and as aluminum careridge case. On firing, the flash from the papellant ignited the delay pellet in the grande base plate and this, in turn, ignited the ejecting charge which expelled the message comminer, silk streamer and smoke

expelled me measage commones, sith streamer and suppose generator, (p. 345).

g) 27 mm baltiseare Stpan Cantridge fired from a signal pissol, congesisted of a light alloy outer cylindrical casing (the base of which contained the propellent and Partuesion cash) and, as inner cylinder which contained skir green cap) and so mer cytener which contained sixt green and red ster units. Senning through the center of the stay units was an assembly of two concentric brass tubes which were hald in position by a central cannelure into which the inner cylinder was indented and fixed by means of a steel pin. The outer brass cutie had one set of 6 flash holes adjacent to the inner surfaces of the six stars. The inner brass tube also had a set of flash holes which means of a setting cap could be aligned so as to permit the ignition of a selected number of combinations consisting

the ignation or a selected number of compinations consisting of red and green stars as shown below: -a) 5 red & 3 green, b) 1 red & 2 green, c) 3-red & 1 green, d) 1 red & 3 green, c) 2 red & 2 green and f) 2 red & 1 green, The inner brass rathe was filled with black powder and was closed at the lower end by a screwed plug which con-

tained a delay polict.
In firing, the inner cylinder was ejected (by propellent range, noe most cylinder was ejected (by propellest gases) from the quiet light alloy case, and, alter the drigs, pellet had burned through the flash passed immediately along the whole length of the inner base, 10ke, igniting and ejecting the sters in accordance with the setting. The entare which were but in given fell to earth in the common of the c

Plastic Emplosives. Several plastic explosives based on PETN and RDX were used in Germany during WW II. One of the earlier compositions consisted of RDX treated with American vaseline (see Note) until this vaseling became unavailable. Thereafter mixtures called Plastic and Hexaplant, which did not contain vaneline, were used?

Note: American vancling was considered most anitable . because it is long liber" and can be stretched like dough to form threads. European vaseline, such as the Russian, is not tacky and does not produce good plastic explosives. (See also Plastic Explosives in the general section). Reference: PB Rept 925 (1945), pp 74 & 77.

Pleaties. (Kunstatolie, Preas-stoffe); Manufacture and properties of plastics are described in the following References:

1) W.Krannich, Kunststoffe im technischen Korrosionsschütz. Lehmaun, Müschen-Berlin ( 1943)

Lehmann, Müschen-Berlin (1945) 21 H.S. Betzgen, PB Report 7932 (1943) 3) Anon, PB Report 91836 (1945) 4) BIOS Final Reporter 282, 453, 445, 926, 1191, 1246 and 1729 (After Wy II) 5) BIOS Miscellaneous Reports: 1, 85, 87 and 98 (After

6) C105 Repoiter 29-62, 32-26 and 33-23 (After Ww II)
7) H.Sachtling w W.Zebrowski, Kunstatof-Taschenbuch, Manner, Müschen (1952).

Riestian in German, Ordnenca, During WW II there was a growing use of plastics in plants which manufactured acids, explosives and ammunition. For instance, linings ( for canks and pumps, funnels, pipes, plastic trays for drying explosives, sealing plugs in delay deconstors etc. were funditured from plastic material. One of the plastics developed in Germany was Mipolam. Others were Novolac, Lignotol, Igelimulver, Trolicul etc.

Reference PB Rept No 925 (1945), pp 7 and 25.

Plante A plantic explosive of WW II; RDX 64, coiled cotton 3.3 and liquid or semi-liquid sitrohydrocarbons 32.5%, It was less officient then the American Composition C2 because is contained less RDX [ Allied and Enemy Explosives, Aberdeen Proving Ground (1946), p 127 1.

Plasses, Celludel, Celludin oder Camphressel Frade asmos-for p-Yolyanesulfamide, CH.C.H. SO NH, white flakes, mp 137, obtained as a by-product of saccharing manufacture. Its 20% alcoholic solution gristinges coiled comon completely at 550.

[ Knut-Mets, Chemische Untersuchung, Braunschweig (1944). p 163 7.

Pleatement (Plantomenite). According to Deniel (Ref 1) plantomenites were propellents invented about 1889 by Guttler. They consisted of mixtures of the nitrated products of cellulone, sugar storch, aromatic compounds, sec with oxidizing substances such as inorganic nitrates, chlorates, chromates etc. These compositions were modified beginning 1897 by incorporating 0.5 to 10% of colophony.

According to Marshall (Ref 2), Plastomenize was an early (1889) sporting amokeless propellant prepared by gelatinising NC with DNT.

Colver (Ref 3) stated that Plastomerice was a German propellant prepared by blending 5 parts of molten DNT with one part of hitrolignia and sometimes small anounce of Ba nitrate. After incorporation the fused mass want granulated.

Brunswig (Ref. 4) gave Plastomenit, as containing suncotton 67, Ba nitrate 13, TNT 13, DNT 6 and moisture

Referenceat 1) Daniel, Dierionnaire des Mutières Explosives, Paris (1902), p 634

2) A.Marshall, Explosives, 3,(1932),p 98

3) E.Colver, High Explosives (1918), p.169 4) H.Brunswig, Das rauchlose Pulver (1926), p 134.

Pleatrit . See Pleatrotyl.

Pleatretyl or Plasfelt, According to Colvet, High Explosives (1918), p 249, plastrotyla were plastic explosives patented by C.E.Bichel in 1906 (Ger P 181 574). They were prepd by mining 85 to 87 parts of TNT with liquid of solid resins, such as coparba balsam, benzoin gum or styrax, with or without liquid DNT. The plasticity could be increased by incorporating some colled cotton, Table 37 gives some examples. (See next page).

Plettenberchuse (Place Shooting), A place test for the estimation of the brisance of explosives similar to the one described in the general section.

Ingredients	% Composition										
		7	3	4							
THT	87.0	85.0	85.0	85.0							
Copalha balona	0.51	١.		١.							
Loren turpontine	١.	14.05	'	-							
Liquid seyear	-	-	6.5								
Beaton gas	٠.,		-	4.5.							
Liquid DNT			10.0	10.0							
Colled cotton	1.0	10	0.5	0.3							

Plates strangelyer (Blank - Cartridge Propellent). The following composition is given in Branswig, Des reachtone ... Pulvey (1926), p 136: éollod cotton 23, guncotton 74, diphesylamine 0.7, soot 0.3, moisture 1.0 and residual velatile gelacinines 1.0%.

PMF-107. Same on Pollpulves 109 (Fp 109), described mades Filler. POL (Paiver shop Loung smittel (Salventines Propelines) See

nuder Propullmen. Pallopus Can of the plantic materials developed prior to WW II by the Dynamic A.-G., as Trainfeel. It is a measurable product.

Raferencen: )

1) K.Krunaich, Kunftssoffe in Technisches Korrosion sochätz,
Leimann, johischen Seilir (1943), p. 21

2) H.Sackisig in W.Zytorwski, Kaustoff-Taschenbuch,
Chiesann, idheches (1952), p. 240 is 254

3) H.A. Tisch, Picadam, javenni; patress communication.

## Politicant See POL

Palyamide. According to CICS 21-3 (1945), a Nylon type polyamide win developed at the Transdorf Plans of Dynamit A -G. No description of its manuf and properties in given. Polyslyhel (PGK; (Polyglycol). A liquid product consisting

of about 79% diedeyleneglycul (DEG), called in Germony Digiyhal, and 29% ethyleneglycul (EG) called Glykol (OFE This product, was manufed before and during ween if by I is present, was manuer person and during with 13 by I of Farbanication surviving with chiphene of this in man was obtained wither from blaze furnace gas of the liquefunction and unbisequent functionation) as by hydrogenation of acceptance. This means that meeting more proportionally upon the most of the proportion quired for its maintacture of ereas for the manufacture of alverein "critical food selférials such as fats were required. Then this product was nighted, a liquid explosive was

obtained which flowed to be a better pelatinizer for NC than NG. Mether advantage of nivered polyplycol (NPGc) was start it produced much cooler propellages (popularising lass' calorific vaine) then was ever possible with NG. m. Ser. G" Pulver).

References D.W.Stickland or al, General Summery of Enplacives Pinets, P.B Rept No 925 (1945), # 1%.

Polygon, is plastic composition which whom spotied to the surfaces of combunities solids prevented them from bearing. If was used for conting the samebuning surfaces of solid. recher peopellants. Reference: TM'9-1985-2 (1953), p 201.

Palystyrene Plastics. According to CiOS, 21-5 (1945). Forty styrene remeries. According to CRD, A107, A107, A 5, the IC Farbenind at Ladwigshayen produced two types of polyscytuse which softened as 64 and 72 respectively. He copolyments of styreng-water used.

Polyorethme Pinetics Preparation described in CROS Report 29-12 (1945).

Polyvinylco-basel Pleatie, called Luvices, was massis-factory for injection molding because of its high isoliting point (over 200 ). Considerable pressure was counted to mold it sad this ceased rapid wear of the molde. Reference: CIOS Rep 12-3 (1943), p. 8.

Polyvikyl Chloride (PVC) was used in Germany for the preparation of vanous plastice (Ref 1) and in some pyro-technic compositions (Ref 1). The following polyvinyl chloride plastics are mentioned in Ref 1:

Ref It:

a) Visidus (q v)

b) Mispoland q v

c) After-cibiotanaed —PVC- it contained up to 60% of

Cl and was very stable. It dissolved in archylene

chistode in which the original PVC was not reshelp a

Lefarmecen: M.F. Foglet - F. J. Cartin, CIOS Rept 21-5 (1965), p. 5
 T. Uthański, Przemyst Chemiczny, 27 (4), 487 (1948).

Forefor N. Code number for the product people by IG. Factors tadustric by condensation of accross with audiese cynnide and hydraune suitsee, followed by treatment with sodium

- (CHE) GEONNANTH OFFICH J.

The product was used in the cantilactor of posters considered a creating for Schoolful lubri and submirate profession and continue for Schoolful lubri and submirate professiones (see audie post). It has the property solving accepts when the submirate with vary! of the second continue and the submirate with vary! of the second continue and the submirate with vary!

1307:
Similar properties with displayed by Porefer Dis (Dianoussdobenisme) and Possible 234 (proper similarly, to Porefer N by 19672 cyclobraneous tassess of normals.). Reference: ClOS (Sport 25-18 (1543), p. 30.

Pototo jeffinge or Stick Hand Granado (Stielhandgranate) consingle of a wooden stick (handle) to which was attached mentic can filled with an emlouive. A similar type was the Japanese Type 98 Stick Hand Grenadi and also the Russian Stick Hand Gresade.

Reference: TM 9-1985-2 (1953), pp 319-320 (Scinthand granates 24, 39 and 41).

Pawder Metallutay. See Pulyametallurale.

Pro-abgraved Projectile. See general section

Pro-riffed Projectile . See Rifled Projectile.

Pressing of Employives German procedure in briefly described under Krummel Fabrik, Dynamis A G , Prenning of Explosives, egc.

Pressing C.Honard et al, Hen poud 34, 179 (1952) stated that Presaling way a German explosive of WW II containing some tetracitrosulfuzydiphenylamine,

a yellow solid with mp 3680. The term compd was proped by nitration and oxidation of thiodiphenylamin (phenthiazine)

Primariadung (Primary Charge) is a cop charge of a blanting

chp or demonstor. Explosives used for primary charges are described under Primary and Intrinsing Compositions. Primary and Initiating Compositions. The following Germet terms are used in consection with this subject: Zunal-thurs

(Primer Charge), Zunelhütchen (Primer Cap), "Millagts (Initiating Composition), Initialsunder (Initiaroff, A general

description of primary and initiating explosives may be found in Refs 1, 2, and 8 as well as in the general section-Leffefs 4, 5, 6, 7, and 8 are listed explosives used during WW IL Mercuric fulminate was used extensively during WW I, but only in a few types of primers during WW II. Table 38 lists some German primary and initiating compositions used in fuzes, primers and detonators.

1		I		Coffe	position %						
ł		M P	LA	L St	Sb <sub>x</sub> S <sub>3</sub>	Tema-	NC	Cn nilicide	Ozidizer	Abçasive	Uses
	•	153			23.5				KÇIO <sub>3</sub> 43.0	Glass 10	Primers is shells and
			82 60 55	94 88.7 37.5 49.1 32.1 40 45 85.6	7.4	4.2	6(*)	12,4 15,4	Ba(NO <sub>3</sub> ) <sub>2</sub> 38.5 Ba(NO <sub>3</sub> ) <sub>2</sub> 35.5 Ba(NO <sub>3</sub> ) <sub>2</sub> 47.9	Glass, 11	some both fuses Electric fuxe primers Same as shove Primers Primers Primers Primers Primers Sandard deconstors Same as above Detonators

\* is nompositions (b) and (c) the NC was made into a parte doing anyl accuses. Then the paste was beaded to the implican bridge of a primer.

Table 39 lists some tartridge case primer composition unied during WW [1

Composition %	Nee s
L Sc (8.7 and NC lacquer 11	.3 50 mm HE, 50 mm APRN.
	30 mm APHV, 75 mm HE and
	, 75 mm APC
ECIO, 35,Sb, S, 37,M F, 21.5	20 mm HESD, 20 mm APLC,
and absentive 6.5	50 mm APC IC, 50 mm APC
* 6-	SC, 50 mm APHV LC, 88 mm
ECIO_44,56.5,24,1 F 23	HEMTF and 88 mm APC 37 mm HE, 37 mm HEMB, 37
and abouting 9	mm APRN, 37 mm APHV and
. ,	105 mas HE How
KC10,28.2, Sb, S',31.1, M F	47 mm AP, 47 mm APRN, 47
25.7 and abrustee 15	min APHV NP and 47 mm HE4
KCIO, 29.1, 55, 5, 43.4	47 mm HE
M F 16.7 and abcasive 10.8	As man the
Be hittere, L St and abranive	20 mm APHY
Be nitrate 47.9 and £ Se 52.1	
L St 19.2, 55, 5, 6.1, Ph.	80 mm CM
nitrate 53.6 and abrenive 21.1	
25t 26.4, Sb_S_18.2, Pb-	
der 100, 20 2 18.2, bP-	50 mm TM
nitrate 50.1 and shrasive 5.3	

Table 40 lists some primer compositions used to fares

Abbreviations: AP Armor-piercine: APC Armor-piercine. capped, CM Chemical mortar; HE High explosive; HeC Hollow charge; How Howkner; HY Hypersyelonity; 4 Incondicry; IC laser charge; L. A. Lead axide; LC Long.

47 mm APRN, 36 mm HETA 50 mm APC LC, 50 mm API 50 mm APC SC, 50 mm CM and 68 mm AP Shalls; some
57 mm APRB, 37 mm APRB 47 mm APRB, 50 mm HETA 50 mm APC LC, 50 mm API 50 mm APC SC, 60 mm CM and 68 mm AP Shells; some
47 mm APRN, 36 mm HETA 50 mm APC LC, 50 mm API 50 mm APC SC, 50 mm CM and 68 mm AP Shalls; some
47 mm APRN, 36 mm HET 50 mm APC LC, 50 mm AP 50 mm APC SC, 80 mm CM and 88 mm AP Shalls; some
50 mm APC LC, 50 mm AP. 50 mm APC SC, 80 mm CM and 88 mm AP Shalls; some
and 68 mm AP Shalls; some
Load Mines
47 mis AP and 75 min APC
Sheils
47 mm HE Shell
47 mm HE Shell and 100 m How Shell
75 con HE Shell
TO MINING SILL GROWING
75 mm HoC and 105 mm Ho
Shelle
88 mm AP Shell
50 mm Mortae Shell
1
Land Mine (Tellermine 35)
Land Mines Tellermines
and 45)

curic fulminate; MTF Mechanical time fune; NC Nitrocellulose PETH Pentagrithratoi tetrapitrate EN Round nose: SC Short case: 5D Self-destroying TM Treach morter.

Dering WW IL, the Someon also developed neveral types of garless selay deconaters with furtheads comtalaing lead pierses, among other ingredients. (See Paseheads Ad and GA and Fusehead Manufacture). Referenzen:

1) R.Escales, A.Stetthacher, fairial Explosivatelle, Voit, Leipzig (1917)

2) A Crossbacker, Schipus- and Spreagatoffe, Barth, Leibnig (1933) pp 324 335 . 3) Aces, Allied and Enemy Explosives. Aberdeen Praving

Greend, Md (1946), pp 64 & 71 4) Collective, PB Rept 11,544 (1945), part III. Tables I.

5) W.R. Tumlinson Jr. Pic Arsn Yoch Rept 1555 (1943) 6) F. Peisturn, Picatiany Aresnal Clean Lab Rope No 127,024

7) Ason, Army Ordenson 31, No 161, pp 433-2 (1947), 1 German Electric Primers of WW 11

8) A.Stottbucher, Sprang- und Schiusswolfe, Rafcher, Zürich (1944), pp 95-109.

Primary Compositions described in Th 9-1965-3 (1953), pp

3757-went special in the following detaces: 3757-went special in the following detaces: 3757-went special in the following detaces: 46 for an OF carridges for HE shell; contained: MF 28, E chlorest 44, 58 sulfate 32, and glass perceive 58. The unper section (amagazine) of the preser contained 0,65g of gamalias sheek prostee and a 1,64g puller of black postee and a 1,64g puller of black gamains bleck ponder and a 1-4ct pellet of Much.

ponder which served mignate the propulsate (ph. 34c-1).

Prevention Primer (A) Make used in QF carridges,

postment of \$3.25, K. Chance 23.0, Sh unitide (9.7).

commend \$4.7 grains of black porder which serves to

mignic the propulsate (9.35).

() Prevention Primer (J.1), used in QF carridges,

commandist \$7.2 delta (p. 150).

() Prevention Primer (J.1), used in QF carridges,

commandist \$7.2 delta (p. 150).

() Prevention Primer (M. 15).

() Privention (M. 15).

() P

19 277).

In CIOS Rape 33-70 (1946), p37 To described in the following primary composition based to cape for 7.22 and assed to-trigon menuals by the Deutsche Matters and Musissens-Faintsen A-G. Libercin Bs sienze 42, Pb styphnate 40, Transcens 3, Pb percentle 7 and Ca silicide 10%.

Abbreviatione: C Construction; ME High explosive; if Potantiem; MF Mercury fulminates and New Pattern; QF Quick-firing; Sh Antimony, Color also Abbreviations under Tuble 40).

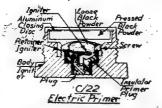
Primer (Zändhunches). According to E. Englenburg. The Ordonnoe' Sergeaut, May 1944, pp 320-1, German Artillery primers were all threaded on the outside and were accessed primers were fill threaded on the outside and were screwed ease the base of a catridge case. The princers were small is compution with those based in U.S. assumation; and the catridge of the initial first. To facing the catridge of the ca

was used by the Germans.

The body and the lanes components of a primer were originally under of hruse, but there was a tendency during WH it to make the hodies of eneel.

Two types of Artillery primers were used: electric

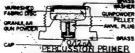
A. Electric primers were employed in all ammunition viol anti-task guns above 5 cm is caliber, for tank gone of 5 cm and larger, for the 7.5 cm Study, for the 8.5 cm I'vi. 41 R 43 and for all calibers of nati-aircraft guns larger The C/22 Sleaters Primer consisted of a brane primer body, a plantic primer plug templator, a brane primer plug, on igniter assembly, a sheet brane igniter architect.



a brass retaining screw, a loner black; powder charge, a pressed black powder charge, a cloth black powder delt;—nod—no elanous—change des cranged is possion to close the forward sed of the primer. The igniture naturality of constant of the condition of the primer of the constant of the condition of the conditi One leaded my in couract such the primer stug, the other with an ignitur retainer. The bridge and the file owner wan no spiture retainer. The bridge and the libes shoneably were occused with a green colored numericalisines in open and around this was placed a loose black powder charge.

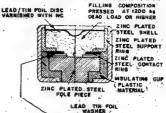
to expect and around min was proceed a force that powder the What the firing circuit was closed the current parased from the insulated primer plus, up one of the feed-tent, through the sure bridge, and down the scheece through the sure bridge, and down the scheece current. The pracage of the current benefit the wilder sufficiently to ignire the lead upparatus percentage autificiently to ignire the land typensor percentage of the current benefit the wilder sufficiently to ignire the land typensor percentage in the following repeat CI has considered as the following the support of the current person of the curr

centur to tweeive a brase savil ping. The ping had a central flank channel and was recessed at the rear-ward said to form an april and to hold a brase primer



cup , containing the pamer mixture. The cup held the cup - containing the pamer maxium. The cup held the miximin against the avulle. Directly shows the plug was placed a small amount of granular black powder with a black-powder pellet covering it. The pellet was held in position-by a brass washer crimped ower a vanuabed fabric disc, when the firing pin hit the primer, the cap pushed the primer mixture against the anvil, thus 'causing the mixture to 'ignite. The flash from the mixture west through the channel toward the tum fixed the propelling charge. This primer was used in annuarison for field gunn and howitzers from 7.5 cm to 21 cm (excluding the 7.5 cm StuG) and also for the 5 cm Pak and the 8.8 cm Flak 18 and 36. (See also Primary and Initiating Compositions).

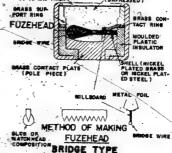
Primer, Electric, Bridgeless Type was developed by the Deutsche Wallen- und Munisionslabeiken A-G, Lübeck, It consisted of a cylindrical casing (zinc piated steel) washer (attached by shellar to as insulating the washer (attached by shellar to as insulating to the washer (attached by shellar to as insulating to washer (attached by shellar to as insulating to washer) and a consect sing. A current of 120-160 volts was required to fire the primer, Robert 37-20 (1945), pp 75 & 77. References the Pepelor, CloS Rep 33-20 (1945), pp 75 & 77.



10.05'-0.1 MM STUCK TOSETH INSULATING RING (PLAS-BRIDGELESS TYPE

ELECTRIC CAP

Primer, Electric, Bridge Type was developed by the Deutsche Vallen- and Municipasiabiles A G. Lübeck and manufactured by the Rhessmetall-Bornig A G. is consisted of a cylindrical SRASS CLOSURE DISC FILLING COMPOSITION CO-OS MM THICK (UNPRESSED )



ELECTRIC CAP

casing mickel placed brass or nickel placed steel) concarning ensentially the following items:

a) A bridge were soldered to two metal foil attips separated by a millboard (in-unator). The bridge were was conted by successive dips in a paste formed by mixing an ignirer compound (such as lead styphases or, ead picrate) suspended in a NC varnish? (See under Fuschead) b) A filling composition: K perchlorate 47, Pb styphnau

23 and Ca silicide 30%, loaded toosely around the fuscheed.

function with electric primers were used mostly for synchronized aircraft guns, such as Manaers: 15 cm MG 151, 20 mm MG 151/200 and 20 cm MG 213. The bridgewire primet existed in two types: C/25 and C/27, each requiring a firing current of 24 volts.

In addition to their use for synchronized puns, electine

primers were used in some Turrer suns and in AA guar-Reference: H.Peploe er al, CIOS Rept 33-20 (1945), pp 73-6.

Priming Compositions Used for Trecers. See bader Tracers

Phogressive Rifling or increasing System of Twist (Zucchmender Deall oder Wachsender Deall) is briefly described in the gedward section under Rifling. Following Gesman recepons used progressive rifling:

a) 75 mm Kwk (6° to 9° rwint.

b) 75 mm KwK 40, L/45 (60 so 90)

c) 75 mm Souk 40: L/43 (60 co 90)

d) 88 mm KwK (40 to 60)

e) 88 mm Flak, Modifications 36 & 37 (4° to 6°

() 100 am K 18 (45% m 6%)

g) 105 cm Howitzer (6° to 12°)

h) 150 mm Howitzer (5° to 10°)

i) 150 mm K 39 (40 17 to 50 50')

j) 170 man Gua (4° 16' 40° to 5° 58' 42°)

k) 210 see # 18 (50 2' 45 to 50 38' 42") 1) 210 mar K 38 (4° 29' 27" to 5° 30')

m) 240 nun Gun (3'0 35' 43" so 70 9' 25").

Reference:
R.P. Baumann of Ficationy Assensi, Dover, N J, private communication,

Prejectile . See Granate.

Prejectie, Flare, See under Flare,

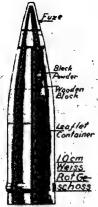
Propogendaryanete (Leaflet Projectile): Our such projectile (caliber 105 mm), designated as 10 cm Weiss Ref Geachess, is tencribed in TM 9-198-3 (1933), p 642, it contained 28% lb of leaflets had a small therage of black powder serving as a burster. The shell was fired from light field howitzers such as IFH 18, 18/1, 18/2, 28mM. 18/39 and 18/40 (See drawing next page).

Empayamentembers 41 (Leafter Rocket), calibet 73 pm, consisted of new neel bushes screwed into a consulption. The lower part consained the toccurrent pinks. Consisting of a cylindrical stick with also longinous perforations—one in the center and eight in a circle around the central bode, Below this were 12 venturi set in two concernitions. The upper section of the misail's continued an inner cylinder (which was split longitudinally) with leaflets wrapped around a sceel, apring which was kept under Compression. The misaile was splin-sublished and was fixed from a single-robe launcher called the Prapopularies for the proposition of the continue of the con The propellant was ignited by means of the percussion cap and when the rocket reached its destination, the ignites (located between the propellant and leaflets) fired the butsting charge. The resulting gas pressure e ected the inner cylinder and the plants cap. As the split cylinder emerged, it tell apart and allowed the comprehend spring to scatter the leaflets packed around it. Reference: TM 9-, 983-2 (1953), pp 2345. (See drawing on next page) .

COP

eaflet

Container



PROPELLANT, SMOKELESS POWDER (Treibmittel, Toribpulves adus Rauchlose Pulver). A general description of German propolinger is given in Refd 1, 2, 3 and 4 listed or the end of this section

Propolinary used by Germans during WV I were described by H.Messeur, Men Artil Fr. 2, 507 (1923) and by L.Pente Laballour, Pondres etc. Buillière, Paris (1935). po 190-291. They included the following propellement

A) & (Reffel: NC (128N) 24, NC (138N) 72.5, DPhA 0.5. Cent 0.5, Am ounlace 0.7, galatinines (residual solvent) 0.5, and moiscure 1.3%

2). Tube (Campa): NC (12%N) 21, NC (13%N) 70, Con-

Table 41 lians same propellants of WW I described Re 2, pp 114-6

Arression

Cent 0.3, and moisture 0.7%

moisture 1.3%

maissure 8.9%.

or Acar 5, K bicartrace 2, residual polyega 0.7, and

C) Wirfelpulver (Finker) propulinet) (Rifle): No (1298)

th Wirfelmstvor(Casson): s) NC (125N) 29, NC (135N)

29, NG 40, Cout 1, and moisture 1%; b) NC (125N) 31.

NC (13%N) 31 NG 50, Cent 7 and moisture 1%; c) NC

(12%N) 50, NC (13%N) 31 NG 20, THT 14-5, DRT U.S.

E) Ribernandone (Tubulat propellant) (Connect: NC.

(12%N) 32-34, NC (13%N) 32-34, NG 29-29, Cent 4-7,

Ass exalate 0.5, No carbonace 0.5, graphice 0.5 and

60, NG 18.5, Cont or Acar 1 and moisture 0.5%

			upullants					77			
Composition S		di Aren	For Ordnance								
	Steep	Cube		Tubulas			Cubo				
NC (soluble)	24.0	60,0	21.0	T -	32-34	29.0	31.0	30.0			
NC (insoluble)	72.5		70.0	66.0	32-34	29.0	31.0	31.0			
MG		38.5		-	25-29	40.0	30.0	20.0			
THT .				25.0		10,0		14.5			
DMT	-		-	1 5.5	-	- 1		3.5			
Cirotentine	0.5	1.0	5.0	0.5	4-7	1.0	_7.0	0.3			
	(or comphot)	( or scording)	1		for weekspel	7	4	1 "			
Diphony legica-	.063		1		,		Pa	!!			
K teruse	i -		2.0	2.0				1.1			
Na oznime	9.7							1 . 1			
Am ounlass .					0.5						
Na hierrhannsu			-		0.5	4.4		1 : 1			
Granhine	1 -		-	1 :	0.1						
Moiscan	1.3	0.5	1.5	1.0+	- 0.9	1.0	1.0	0.7			
Volatile solvent	0.5		0.7				l :	. "			

Note: The Am oxalare was adoud to dominish the danger of ignition during rolling. Abbrevintions: See under Table 44



The information contained below was derived from results of analyses of captured German propellants conducted at Picationy Arsenal, Dover, New Jersey (mostly by P.R. Houken, Jeand H. Jadomitt of the General Laboratory) and also from documentary materials gathered by various American and British missions near to Germany directly after remination of the War, (See Refs 4 and 10).

Following is a general survey of propellants used ducing WW II:

a) Both single and double-base propellants were used by the Gennans during WV II. In double-base proprilants it was the tendency to replace NG by DEGDN. This was partly due to the excessive experion caused by NG propellants and partly because of the shoringe of glycerin while DEG could easily be prepd synthetically from occupiene. Also, DEGDN is a hener gelatinizer tur, NC than NG and for this reason smaller amounts of DEGDN could be used. The DEGDN propellance possessed much lower calendic values than NG propellents but they were not suitable for use in gropical climates on account of the high vapor pressure (and consequently high volatility) of DEGDN (ret also "G" Pulver), Still conler propellants, which were also less erosive and practically free from muzzle-finals were obtained when large amounts of nitroguanidine (NGs) were incorporated, as for instance, in the com-position: NGs 30, NC 43, DEGDN 20, stabilizers and Plasticizem 7% (see also Gudolpulver)

b). An flash reducers the Germans'used sales of potassium such on sulfate, chlorids, nitrate and qualate. They were frequently supplied in bugs for use only at night as they produced empke which was visible in the day time. (See -Vorlage) in propellants conta NGu there was an necessity to use the above salts because NGs acts as a flash reducer

c) Some German propellants contained between 1.5 and 3.0% of hydrocellulose, presumably to improve the burning characteristica, or to reduce flanh

d) An interesting feature of German propellants of low catorific value was the use of mixed gelatinizerssubilizers, such as centralizes, acardite's and wethanes. It was claimed that these mixtures had a better effect on, the working properties and stability than when used individually

e) Of the other ingredients, magnesium oxide was included as a lubricant to facilitate solling and extrading operations, graphite was added to reduce the formation of static electricity during tennulacture, and the inclusion of about 3% alpha-MNN resulted in reducing the charge of low calmific propullants as much as 10%

f) It seems that there were no restrictions regarding the composition of the propellants provided the ballistic properties and stabilities complied with specifications. The composition of propellants manufactured as different plants but intended for use in the same type and caliber or gast were not the same, although day all passars inspection tests.

Table 42 gives compositions of some single-base (nitrocellulose) propoliente examined at Picatinay Argenal.

(See next page)

Hemark - On Table 47

The propellants listed in Table 42 contained a number of fratures which are worth noting, such as:

a) lione of these propellants contained a sufficient amount of con-volatile plasticizes to colloid the NC as effectively as is generally required, it is assumed that a volatile solvent was used in their manufacture which was later semoved by Usying. The amount of centralite present in some of these propellants would not be sufficient to gelectrize the high-nitrogen NC that was used in them but would be sufficient as a stabilizer

b) Since an insufficient amount of centralite was present for the complete gelecinization of the NC, it is presumed that camphot was used in some propellants to superficially gelatifize the surface of the grains. Thus, it would act to a deterrent and cause the propellant to burn more processively >

"c) Several propellants were not only coated with graphing, but some of the graphite was iscorporated in the grains. Concing with graphits was usually done top the following purposes: to decrease the possibility of ignition by static electricity, to make the grains more "fifte flowing" while loading the cartridge cases and to decrease (slightly) the initial race of burning Incorporation 3f graphice in the grains was applicantly done to improve the burning characteristics of the propellant d) When graphite was used for coating only, it is probable

that the grains were previously given a surface treatment with centralite or other stabilizer-gelatinizer as a determent ? coating to make the propellant more progressive burning e) Potagaium salts (such as K sulfate) found in some Gernan propellants, were evidently used as flash reducers, In some cases, however, markings on the bags included the abbreviation Man Puly which senade for Manover Pulver Note These were usually rapid-burning propellents because they were porous. The porosity was obtained by

incorporation and subsequent elimination of most of the potamajum salt by leaching with water f) Some of the propellants examined at Picatinas Armenal. contained DPhA as well as DBuPh. As none of the German pre-We Il single-bear propellants conmined DPhA, it was

presumed that chiese samples were reworked captured French or Belgina propellants g) One of the samples examined at the Amonal contained a

large amount of PETN (63.8%) dispersed through the mass of No. None of the Allied propellants had such composition.

Our of the single-base (nitrocelluldes) probellants used during WW II was prepd by gelatinizing a blend of two nitrorelluloses one tol N content less than 12,5% and another of N content more than 13%. The gelarmizer used was an alcohol-accrone solution. [ See Nitrochemie Industriesningen A-G. Ger P 715.811 (1941), C.A. 38 2211 (19(4) %

In Ref 4, p 41 is described Nitrocollulasa-Blattebansulver (Nitrocellulose Flake Propellant) which was prepd by thospoghly mixing in the presence of otherel-olad 3 parts guncotton' (Schienawolle) of at least 13.15 N content, I part of solubie NC (Kollodiumwolle) of at least 12.6% Content with 0.5% of stabilizer (such as diphenylamine) and 1% of flash reducer (such as Na ounlate). After the mass was flaked, the surface of the kining was treated with centraliste and finely pulverized graphite. The flakes were about 0 3 mm thick and their surface was 1.4 mm2.

Toble 42 Single Bese (Nitrocollulese) Proceilers of WW II

				C	ition, 5	Henry or wa		<u> </u>	
Form	NC	XXI is	DPbA	Cess	Acar	Graph	Other lagred	ients	Unen
Seuare	95.1	13.2	٠.		1.8		Usac	3.1	7.63 nm Nauser
Square	95.2	13.0			0.3	0.2	Unne '	1 4.3	7.92 mm AP
SP	34.3	12.2		0.2		0.3	PETN	63.8	7.92 mm AP
1					1	]	Uesc	1.4	
Square	95.1	13.1	**	١٠,	3.0	1.0	Unne		7.92 mm AP
Square	95.0	13.2			-	•	Et carbanate	3.0	7.92 mm Ball, 7.92
- 1			ł	•	Į.		& K sulface		mm Semi-AP, 7.92
ł		١ .	٠.	ł	Ł	1			man AP and 7.92 ours
		f			[	1			HE 17.92 ma HVAP
SP	52	12.5	١.	0.4		0.6	PETN	60.0	7.92 mm HVAP
.					1 '	1 .	Lunc	7.0	i
Square	98.4 .	13.1	0.9				Usac	0.7	7.92 mm Rifle Greente A/T
	99.5	13.0	0.5			Gophind	•		7.92/.13 mm AP
SP.	35.0	13.2		Some		Thing .	, PETN	34.0	7.92 mm HVAP
					1	46.	Come & DNT	10.0	
Square-	961	12,7	-	2.6		9.3	Unac	3.0	7.92 mm AP
5P	95.0	12.2		2.0	-	0.1	Unoc	-2.9	7.63 mm leaseer
- 1		1	1	١.	1				Pistol, 9.0 com
- 1				Į.	1	. 1	•		Pistol and 28/20
- 1		1	Γ.	ļ	1	l .			mm APHV
. 1	95.0	13.1	/o `		1.7		Linac	9.3	9.0 mm Pistel
٠- ا	97.4	13.0		١٠.	0.5		See	2.1	9.0 mm Ball
SP	96.4	. 13.0	. •	- "-	-3.7	0.2	Unac	2.7	9.0 mm Ball, 9.0 mm
. 1			l '.	1	1 '	1 1			Piecol and 50 mm
5P		lilana i	0.5	2.0	1	0.6			Trench Moreas 13.0 mm AP and 13.0
3P	23.0	12.9	8.3	2.0		0.4	Unnc	2.1	mm HE
5P	93.7	13.3	· .	1.95		6.25	Campbor		20 mm AP
- I	22.1	4213	1	1.37	1 .	6.23	Lines	3,15	
SP	94.7	11.1	0.5	١.	١.	0.5	DBuPb		20 mm HE Mauser
	20.7		6.3	۲.	h * .	0.5	Unac	4.6	AV SEE NE SHEET
Square	95.7	15.2	0.3	3.4		0.5 .	K malfate		20 me HE Maiser
	2011	-51-	[	/"		•	Line	1.8	
SP	93.5	15.1	l . !	2.8	0.6	1.3	E oulface	1.1	20 mm inc
		1			1	[ ", [	Usec	0.5	
5P	93.3	13.1	0.2	1.2		0.3	- K pulface		20 am Solothers
					1		Unec	4.0	
\$P	94.1	13.0	0.4	2.4		0.4	Unac	2.7	13.0 mm AP, 13.0 mm
		7.7			1		,,		HE, 15.0 mm HE and
. 1		1	1 1	,	1		*		28/20 cm APHV
SP	94.1	13.1	2.3	- 1	~	0.6	Campbor	1.0	20 mm APHY, 20 mm
- 1		h .	1				Upac	.3.0	AP, 20 mm HE and
l	98.1	1	1				•	15	20 mm Inc
Tube		13.1	-	-	0.02		Unne		50 mm Treach Mortar
SP .	M.L.	13.1	-	-		س ال	Camphor		75 mm ABC and 75 mm
SP		1	Ì			4.4	Dasc	, 3.4	HE
Se mare	96.1	13.1	1 .: 1		9.5	•	Unne		75 Am HE
Square	93.9	13.0	0.3	2.6	1.4	1.0	Usec	2.2	80 am Expulsion Powder
~	98.4	13.1	0.9	•		- 1	Unne	0.7	7.92 mm Rifle Grenode (A/T

Abbreviations: See under Table 44

Compositions listed in Table 43 are for double-base (NC-NG) propellants analyzed at Picetimy Arsenal during

(See sext page) .

Double Bess (NC-NG) Preseitante

	1	,								
Form	NC .	NN in	NG	Cent	Acne	Graph	Orbier Ing	redients	Uses	
Tube	58.1	12.5	37,2	5.9	:		K culfate	0.3	37 ma APHV	
Tube	69.7	11.9	27.3	1.5	ò.2		K sulface	0.6	37 man APMB	
SP	63,7	11.8	28.5	6.3	-	0.1(jacor-	Unac	N. 1.5	37 min HoC	
Strip	64.0	12.3	30.0	6.0					37 mm Czech	
Strip	64.0	12.3	30.0	6.0		1	١,		40 mm Czeck	
Strip	63.0	12.2	28.0	9.0					47 m AP	
Strip	63.1	12.4	30.3	6.0			L sulface	0.1	47 mm HE	
		1					Unac	0.1		
Strip	62.9	12.2	29.1	7.3			E sulfare	0.3	47 mm APCHE	
	٠,	1 ^			1 -		Unac	0.4	and APRN	
Tube	61.1	12.0	22.4	12.7			DNT	0.9	50 mm APC	
	1		ı		1		Vaselina	1.5		
		1					K salts	1.4		
Diec .	59.6	12.9	39.0 ·		0.7	0.1	Unac	0.6	73 mm HE How	
Dine	59.5	13.0	58.7	-	0.8	0.2(incor-	Unac	10.8	75 mm HoC (Semi	
	1	1				porested			fixed)	
Square	59.5	12.2	38.6	1.6		0.3		-	80 mm HE Normer	
Disc	59.2	13.0	38.5		0.6	0.3	Unsc	1.4	60 mm HE Morter	
Disc	61.5	12.9	38.1	-		-	DPhUret .	0.4	80 mm CM	
Square	58.3.	13.1	39.0	0.8		0.2	User	1.7	80 mg HE	
Square /	59.6	13.0	58.8		0.8		DNT	0.4	105 mm How	
•		1		_			Unac	0.4		
Square	59.4	12.9	31.4	-	8.9		Unac	0.3	- 105 mm How	
Square	53.2	15.0	44,4	-	1.1	0.5	Unac	6.8	150 mm How (Bes Charge)	
Square	56.8	13.1	40.8	- 0.3	0.7	0.1	Unsc	. 13	155 mm How and mm HE	
Square	39.0	13.1	59.0		1.0		Unac	1.0	155 mm How	
Disc	56.5	13.5	41.6		0.8	0.2	Unac	0.9	Miscellageous Morres	
Flake	59,9	18.36	39.0	0.9		0.2			80 mm Mortar	
Square	62.5	12.0	33.0		0.2	0.1	DPhUms	1.5	150 mm Rocket	
	1	1	1 -5.0		1	1	EtPhilies	1.5		
	1		l	1	1 .		Uset	1.2	[	

Abbrevistions : See under Tuble 44

Remarks on Table 43:

The double-base aircocallulose-nitroplyceria propellanta listed in Table 49 were somewhat different from the American and British propellants, as can be seen from the following remarks:

a) In cases in which large amounts of commilies were present, in served sor only as a stabilizer, but also as a plassicistic especially for low-intented NC. The amount of NG in such propolelants was correspondingly decreased. In other cases where the amount of contailing was madely on the contract of the contract

b) it has been shows that when contralite is used in large amounts, it also acts as a flash reducing spacet. The same applies to caredife (asymmetrical diphenylures). When scandies was used as a stabilizer, an amount as low sec 0.07% was sufficient.

c) Vaseline, present is some proprilants was supposed to act primarily as a cooling agent to lower the compensature of conduction and to reduce emelon). It also noted his activations are not coming extent because the manufacturing hydrocarbons present in wastline combine with the passistic of aircogest and thus stabilities the powder; that he est bread, however, that were line to not particularly effective in reducing hydrocarbons.

d) Graphics was used for coating some propellants (see Remarks (2) and (d) to Table 42, but in propellants of large graps size, such as the 155 ms, 130 ms and 120/45 one weapons, no graphite coating was used at the companies of the companies of the companies of the coating was used.

weapons, so graphite costing was used

a) As it some other German propellants, graphite was used not nelly as a costing-agent but it was also distributed, throughout the mass of meterial. [See Remark (c)/

on Table 42 ].

Table 44 gives compositions of some double-base propellants, based on DEGDN (dischyleneglycoidinitrate) and on riple-base (NC-DEGDN-NGe) propellents.

(See peng page).

Deable-Sess (NC-DEGDN) and Triple-Base (NC-DEGDN-NGu) Propolisms

	1 .			Compos	ition, %			-	
Tom-	NC	NC NC	DEGDN	Cess	Acar	Graph	Other Ingredie	mts	Uses
	66.1	11.9	30.2	1.8	0.2		Uesc	1.7	37 mm AP Shall
abe .	63.3	12.1	31.3	2.7	- 25	0.3	K sulface	0.4	37 am HE
ube		11.8	29.4	2.7		0.2	Uasc	1.4	47 am APHV
whe	66.3					9.2	Unac 1	0.4	50 ium AP
uhe	61.4	11.8	29.8	8.4	>			3.5	70 mm 712
'ubq	61.5	12.0	26.0	7.4	٠ .	. 0.3	Vasciine		. '
	1				' '		K nales	0.5	1
	1	F	1			,	Umac	0.8	
	68.7	11.0	28.4	1.5	0.1	- 7	K males	0.4	30 ma APHV
Tube	90.7	P	10.7				Unac	6.9	
	1		32.0		1	0.3	NGn	29.3	50 mm HE
d alone	38.4	12.6	34.6		~ ` .	fiecor-	K suifare	2.7	, ,
	.I	t.						.6.7	
	1				1	porsised)	(added)		
Tube	60.0	15.1	38.4		0.7	0.1	Unte	0,8	30 mm HE
Table .	97.1	12.9	0.9	. 0.1		0.3	Usec	1.6	50 mm TH "
	61	134	32.7	0.5	0.7		Unne	11.0	30 mm APHY
Cuba .		11.3	29.8	2,2		0.2	K oulfare	0.5	30 mm APHV, 47
Eube	66.4	11.0	25.0	. 4.4		V-2		0.9	om APHV, 37 mm
	1 '	1	1		1		Usec .	V.y	
	1 - 1	ł							HE and 37 mm AP
	37.6	12.2	29.8	-		0.1	NGe	31.4	42/28 ma Tapered
		, , ,		1	j	1	Unac	1.1	Bore and 42/29 pm
1	1	1			1.	1			APHY
	63.0	11.9	23.2	6.8		ده ا	K mulfase	1.5	75 mm A.P
Tube	63.0	11.9	43.4	0.0		1 4.5	Unac	3.4	O man right .
	1 1			1		l			
Turker	39.0	12.5	30.5			0.1	NGs	28.9	75 mm HE
	1	1	ł	1	1	!	Unne	- 1.5	
Fube	62.5	13.0	34.4	١.	0.6	0.3	K malfade	2.5	75 mm HE
-	1	-2.0	7				Unsc	0.3	1
	63.5	12.4	1 33.9	2.4	6.4	0.1	User	0.7	75 mm HoC,
leip (da)	63.3	14.4	33.7	1.4	W4.	) V	(VERMIT	0.7	Somi-Fixed
	1			1	ļ				
erip	39.6	12.8	38.6			0.2	- EcPhUrec	1.2	75 mm HoC,
2.0	1	1	1		1		Uesc .	0.4	Semi-Fixed
Fubr	60.3	11.9	28.2	7.3		0.4	Vaccline	2.0	75 am Teak Ges
	1			_		(incor-	K mulfarm	1.1	
	1	ı	l	1 .		ported)	Uesc	0.7	'
• • • • • • •	38.4	12.4	31.5.0	1	1	0.2	NGu	29.0	75 mm HEHoC, 75
Square	38.4	144	38.3						
2	ł	ļ	1	Į.		(succe-	Unac	0.9	mm HE Pak 40 an
	1	1 -	1	1	L '	porimd)	'		50 man HE
SCHOOL.	62.0	12.4	26.0	7.6	0.2	. 0.2	ExPhUres	3.1	76.2 mm AP
Noos:	76.2 -	n ted rout	M am west	des were c	hose		Umac	0.9	
	CARTON	ed in Russi							
Flake	1 98.6	12.2	. 30.9			0.3	NGs	30.2	76.2 mm HE
runer Tube	67.2	111.8		1	1 -	W.5		1.3	70.2 mm A.D.
			28,2	3.3		-	Usac		88 mm AP
l'ubo	43.0	11.0	18.5		0.2	-	MGs	31.2	85 mm AP
	1	1.	1	l	1	1	DPhUerc .	3,2	
	1 .	1	1-	1	i .		ErPhUser	2,2	
	10	1.	ŧ	ł	ł	1	Usance	~ 1.7	1
Nabe	66.7	11.8	28.2	3.3	1 .	1 -	Unac .	1.6	80 mm HE
		13.1	37.3	0.3	0.4	0.3			150 ma How
dame	61.6	43.4	7/3	, w	0.4		Unac	0.3	1 - JV THE ILOW
	1	I	1	1		, c			(Zouse 1-6)
- Pranty	62,1	13.0	3-6.6	0.4	0.3	0.1	Unac	0.5	150 mm Now
		1		1	1	1	1		(Zone 7)
Disc	59.6	. 13.0	3.8.7	0.4	0.5	0.2	Umac	0.6	150 mm How
	1		1	1	1	1	1	210	(Zones 7&8)
Tube	-59.6	12.6	33.6		i	0.2	DPhUms	1.5	75 mm Rocket
	27.0	14.0	22.0	1	1 -	0.2		. 1.5	/> mm Rocket
	1	1	1	i	1	1	Et Ph Uret	3.0	1
	1	i	1	1	1	1	Umac	2.1	
Tabo 🔑 🗀	61:1		33.3		2.1	0.2	Unac	3.3	150 mm Rocket
Tube "	19.6	12.5	34.8	I -	0.2	0.2	ExPhUres	1.2	210 mm Rocker
	.1	1	7-10	1	1		DPhUres	2.0	And here well-read
	1	f .	i	1	Ī	1	Carnauba waix		
					1		CHURRADE ASK	0.3	
	1	1	1						
Tube	60.6		35.4				Unsc	1.7	300 mm Rocket

(See also G Pulver and Gudoloulver).

Abhendestenen: AA Annianceste, AC Alectesty Aren Academ; Am Annonium, AF Armor-piercing, A/P Antipris onnet; APC Armorpiercing, Capped; AT Anniance, Cent Centest the; CM Cleancest Science, 1984b; Dubuy Johnhaise; GEC Deithy Interface, 1984b; De

# Remarks on Table 44 (See previous page).

Although the above DEGDN and NGu plus DEGDN propelleasts were similar in composition to NG propelleasts listed in Table 43, they had some features which are worth sociage such sa:

so only section as definite relationship between the perol There was definite relationship between the perological period of the period of the period of the RC was depressed as Not of ECOM (which has about the same promptial as Not of ECOM (which has about the same promptial as not period of the period of the same promptial of the period of the period of the period of the same period of the same period of the perio

b) The use of low airrogen content NC, such as \$1.8-12%, in DEGDN propellests may be explained by the fact that high N content NC is much more difficult to geletinize with DEGDN.

on or of the control propellants contained about 30% NGs and only about 40% of NC, without any unabliter. In most of these about 40% of NC, without any unabliter. In most of these control of the contro

e) From the American point of view the DEGDN propollants have the following disadvantages over propellants based on NG.

1) They are more volatile

2) Less sensitive to flame and thus more difficult to inche?

3) More toxic to personnel handling them

4) They contain an ingredient (DEGDN) which is more difficult to authilize than NG.

H.Marsour et al, Mem poud 35; 280 (1953), gives the composition of a German propellant, used in rounds for 50 mm simplane cannon, as follows: NC (N content 11.81%) 63,51 DEGDN 76.5. centralitie 8.0 and vasaeline 2.0%.

Some information on DEGDN-NC propellants prepared at the Discherg Fabrit, DA-G may be found in Ref 7. Two of these propellants used in cainform are listed in Table (5m.

The same Ref 7 gives the composition and properties of the DEGOD propellate manufel by the Volff Co Plant as Bimilize, near Valerode: NC (N contrast 12.13%) 28.6 (
DEGON 17.4 DPhA 0.5, Cent i 0.5 and TNT 53.0%, Oxygen balance 16.51% and calorific value 750 kcal/kp.

Some double-bane (NC-DEGDN) and triple-bane (NC-DEGDN-NGu) propellants manufactured at the Directory Fabrik, Dynamit A -G were described in Ref 5. Their composition is given in Table 45b.

(See next page) .

Table 45a NC-DEGON Propellants of Düneberg Fabrik D A -G

Composition and -	German De		
properties	\$6702	B14232	
NC .	29.45	48.59	
% N in NC	12.0	12.5	
DEGDN	2 9.45	26.16	
Am nitrace	40.00		
Dicyandiamide		. 25.00	
Centralite I	1.00		
MNN	1 . (	1.00	
Mg oxide -	1 . 1	0.15	
Graphice	1 - 1	0.10	
Moisture	1.10	0,80	
Total	101.00	101,80	
Oxygen Balance, 78	+3.29	-22,41	
Calorific Value, knal/kg	1143	719	

Abbreviations: (See under Table 44).

18 Ref G is described the manul of NC and propellants at the Kümmel Fabrik, Dynamit A-G, while in Ref is described the manufacture of NC and propellants as the following plants: Troided Fabrik D/A-G. Elembander Fabrik

is the prepo of propellants at the Rottpell Plant the Slerid consisted of 20 parts NC, N content 12.5%, and 80 carts of NC. N content 13.3%.

Table 46 gives some properties, including the burning characteristics, of several German propellians examined at Piccationy Arsenal during W II (Refs 4, 10a, 10f and 10 g).

(See nest page). Remarks on Table 46:

Remarks on Table 46: a) In the compositions given in Table 16 only the main ingredients are included. Other components, such ass such lass stabilizers, praphic, etc. were given in Tables 42, 45 a 44 b) Force of a Propellant (HeV) is a function of its chemical composition.

O Quickness (a) of a Propellant is a function of granulation as well as of its composition. The most important variables are total volatile contents and self-time. The quickness of the properties of the properties of the quickness of the properties of the properties of the deposition of the deposition country is used to a large the quickness.

d) The relative gueleness of properlants is obtained by dompaing the buming near with he rate of a susadant's if companison is made between a German propellant and a standard American propellant, the results are likely to be malesding sance the German guns (made with a heavy bleech) used propellants designed to develop the anxisum pressure repolly and after the shell had travelled only a

C-DEGDN) and Triple Base (NC-DEGDN-NGu) Propoli

	,										<u> </u>	
	<u> </u>	DOM:	<del></del>		Compos	sions, ?		15	4.3		Calorific	
Term	NC.	ia NC	DEGDN	NGu	Cent	Acur	Graph	MEO	Other Ingredie		value ical/kg	Uses
Flahe	63.65	13.0	35.80		-	0.50	1	0.03		-	0.4	Various Hows
	54.40	13.0	64.50	٠.	١.	0.30	0.05		K oulfore	0.50	- 1	Various Hows
	36.03	13.0	31.12	30.00		0.50	0.10	0.25				Various Hows
Tuba	67.63	12.0	29.00		3:00		0.10	0.25			825	Since A'A smill
				ì	l .	¢5		1				Heavy 100 mm Gun
		l				b .		Γ.	1 '			(K18) (Army)
Tube	64.22	12.0	29.23	٠.	1.70	0.30	0.10	0.25		٠.	870	37 am AA and
1		l		ĺ				1				37 mm A/T(Atmy)
î mp e	62,33	15'0	26.72	, .*	ą.eo.	6.	0.10	0.25	Vessline	1.80	700	. Heavy Army Field
		l					- 1	Ť	Phthalaco	0.80		Hows
Tube	61.53	12.0	2637		7.50	• •	0.10	0.25	Vaccline	1.60	**	100 mm Army Gus
- 1	17 6	1		,		٠	[	1	Phthe lace	0.65		(K 10)
14	64.08	12.0	27.47		5.35	ŀ		1	K sulface	2.00		
Tube _	94-96	12.0	27.47	•	3'23	-	0.10	0.25	Vessline	1.85	730	88 min Army AA Gus
\$ 7	43.51	12.0	18.64	30.00	1 - 3	0.50	1		Pittin inco	0.90		
1960	43.34	14.0	181.04	30.00	- 1	,0.30	0.10	0.25	DPh Ures	3.25	750	88 mm Acmy AA HE
rate	19.48	12.0	16.92	30.00				1	EtPhUme .	3.75	1	Gen
1,000	37.46	13.0		39.00	"		0,10	0.23	DPhUres	4.25	730.	36 nm Army AA
- 1		1 1				!	4	١.	EtPhiliret	5.00		and AP Guno
ruse	69.52	12.0	14.59		3.00				K nitrace	4.00		**
	93.34	44.0	10.20	•	3.00		0.10	0.15	DNT .	10.00	730	Man AA and
rate 1	60.55	12.0	25.95		3.79		0.10		s lphe-MNN	2.00		other Army Guan
	ou. 33	1 *4.0	43.93		3.77		0.20	0.15	Hydrocell	3.00	730	Various Army Gues
- 1		! !	1.1		-		l		DNT	4.00		
rate 1	44.00	12.0	18.65	20.00					alpha-MNN.	2,50	-4.	*
	44.00	1 **** 1	(8.40)	20,00	۱ ۱	0.40	0.10	9.13	DNT	3.50	720	Yacious Army Gunn
- 1		[ I	1 1		1 1				alpha-MNN	2.00		· .
- I	`	[ ]						Ιi	DPhUrer ErPhUrer	1.50	. 1	
ŀ				,			١.		Hydrocel	1.50	1	
,	4	( )	`		-	. ~				4.00		
Cube 1	69.38	12.2	25.27	- 1	5.00		0.10	0.25	K aisence	4.00	-4	1
	65.53	12.2	23.87	- :	9.00		0.10		Phehalase		820	Naval Guns
	65.71	12.2	23.54	- 1	2.50	0.50	0.10		aloha-MNN	7.00	730	Naval Guas
	58.35	12.2	~		12.00		0.10		TEGDN	25.10	730	Naval Guna
			· 1	- 1	14.50	. ' -	0.10	0.23			650	Naval Guas
Table	35.50	12.2	21.75	40.00	· . I	0:50	0.10 2	0.34	DPhUret	0.70	820	
				10.00	1	0.50	0.10		EcPhUret	-0.70	a20	37. mm Naval Gue
- 1			- 1	1	'	.			K aulfam	0.50	.	
ube	42.45	12.0	18.20	25.00			0.10	امعطا	DPhUres	4.50	730	Naval Guas
- 1	- 1						****		EcPhilires	4.50	130	Maral Guas
- 1	- 1		. [		- 1	1			K sulface	5.00		
. ,	60.17	12.6	35.33		. [	.			Hydrocel	1.50	- 900	
	ı			. 1	- 1				DPhUret	1.00	>00	Universal compo-
- 1	- 1			1					ErPhUrer	1.40		nition for Rocket
- 1	- 1		- 1	·	- 1				IG Vax E	0.35		Launchen
- 1	- 1			- 1	- 1	ì	,		K nitrate(adde			
- 1	59.03	12.6	34.42	- 1	- 1	0.50			Hvdroce i	3.00	865	740
				- 1	1				E (PhUess	1.90	805	300 mm Rocker
	- 1	- 1		- 1	- 1	- 1			Vaseline	0.50		Lapachez

Table 46

<del></del>												٠,		
		Com	posit	ion,%				Some Pro	perties		Rwame	Charge		J
Form	NC	%N in NC	NG	DEGDN	NGu	Uses *	Jeb(in	н	v	Force (HxV)	J,	A	С	÷
SP Tube .	63.6		28.5		- 1	37 mm hEHoC	.0304	881.5	776	6/4.846	6.62			٦
Coal	65.7	13.08	20.8		-	Antitank Gun	.0628	890	842	/49.380	1	1	1	
SP	59.6	12.5	١.	38.8		Rocret ·	2 46	829.7	705 8	585,602	5.53	1.	1	
SP SP SP	63.0	11.9	١.	26.5		100 mm K 18	,0337	740.1	907.4	597,556	5.08		1	
	38.5	11.3		16.5	34.6	88 mm HELC	.0577	706 9	680.1	466,762	1.2	1	١٠	
Square	36.0	12.0	١.	31.0		76.2 mm A/T	.0209	877	777	681,429		1.	1.	
SP4	65.0	11,93	i	23:2	- 1	75 mm APCLC	.0600	. 71 2.1	722.5	512,349	4.21	1	i '.	
Strip	63.5	12.4	١.	33.9		75 mm HEHoC	.203	893.8	711.3	635,760	7.0	Ι.,	1.	
Square	39.4	12.9	۱-	30.9		75 mm. hEHoC	.0249	910.6	706.2	643,066	7.26	l I	1	- 1
Cylinder	59.6	12.55	-	33.6	-	75 mm Leaflet Rocket	.333	856.6	721.0	617,608	7:20	14	Ε.	9
Square	40.0	12.4	ļ -	30.3		75 mm HE Tank	.0261	901	767	691,067		١.	١.	1
SP SP	37.4	12.2	-	30.2	31.3	42/28 mm APHV	.0279	883.2	716.2	632,228	5.6	1.0	F.	1
SP	94.8	12.8	١.			28/20 mm APHV	.0237 -	BZ9.7	705.8	- 585,602	0.94		1.	1
SP		13.03	١.	-	- 1	28/20 mm AFHY	.0211	829.7	705.8	585,602	0.94		1:	- 1
Square	53.15	13.0	44.4	٠.		150 mm Huw	.0067	1235.1	588.6	727,333	. 9.9	.05 .	211	1
Square .	61.64	13.1	-	37.3	l - i	(Base' Charge) 150 mm how (1-6 zones)	.0484	1015.9	685.2	696,094	81	.017	167	
Square	62,13	13.0	20	36.6		150 mm New	.0313	993.6	696.7	692,242	8.4	.009	144	ı
SP Disc	59.6	13.0		38.7		(7 zone) 150 mm How (7-8 zones)	.0722	989.4	704.5	697,037	3.8	.21	158	

Abbreviations: A Constant called Vivacity; C Rate of evolution of hor gases at a pressure of 20,000 pai in litera at atmospheric pressure / sq.cm of surface / second; H Heat of Combustion in kcal/kg; P Pressure of propellent gases in pdi: V volume of rases liberated in 1/kg. Burning este (quickness) of the propellant at 20,000 pai in inches/sec; (HnY) Force or Timemodynamic Potential. Other abbreviations are given under Table 44.

abort distance along the bore of the gun. On the otherband, in American guns with a lighter breech the propellabte ore designed to develop the maximum pressures more slowly and after the shell has travelled a greater distance along the bore of the gun

e) in the relacion of quickness to composition, it may be noted that the single-base propellants are the slowest and are comparable to those double-base propellants which contain NGu. Propellants containing NG are usually the fastest, followed by DEGDN propellants, in some cases, however, DEGDN propellents are faster than those concaining NG. This is usually the case when the NC iq a DEGDN propellant is of considerably higher nitrogen content than that used in a corresponding NG propellant f) The huming sace of the German 2:0 mm rocket propellant was given equal to: -0.35+(29.4×10 P) while the corresponding value for the standard American double-base 7/8 stick propellant is: 48,6×10 P. This means that the rate for the American propellant is about 65% greater than for the German propellant

g) Experimental procedures for the determination of the burning rates of propellance are described in Pic Aten Tech Rept 1235 (1943)

il Methods of computation of properties of propellants are given in the Du Poet Burnside Laboratory Memorandum Report 31.

References (Propellance) 1) A.Marshell, Explosives, Churchill, London, v1 (1917) \*2 (1917) and v3 (1932)

2) H. Brunswig, Das rauchlose Pulvez, W. de Beelin (1926) 3) A.Stettbacher, Schiese- und Sprengstoffe, L.A.Ram.

Leipzig (1933) 4) Collective, PB Rept 11,544 (1945)

5) O.W.Stickland et al, PB Rept 925 (1945) 6) L. Nutting et al. PB Rept 16.666 (1945)

7) F. J. Krieger, M. Plesser. PB Rept 7826 (1945)

8) R.Ashcroft et al, BIOS Final Report 833 (1946), frem 2 8a) H.H.MPike; CIOS Report 31-68(1946); Report on Visit to Duneberg Factory of D A -G

9) A.Stetzbacher, Spreng- und Schiesstoffe, Rascher, Zürich (1948)

10) Picatinny Arsenal Technical Reports:

a) Collective, 1282 (1943) (Foreign Propelients) b) A.B.Schilling, 1358 (1944) (Propelling Charge for 155 mm Separate Loading Ammunition)

c) A.B.Schilling, 1439 (1944) (Separate-Loading Propelling Charge Assembly for 105 mm Recoilless Gun, LG 411

d) J.P. Wardlaw, 1443 (1944) (Propelling Charge fo Separate-Loading 100 mm Gun, K 18) e) A.B.Schilling, 1453 (1944) (Propelling Charge for

210 mm Separate-Loading Ammunition) f) Collective, 1456 (1944) (Foreign Propellants)

g) W.R. Tomlinson, jr. 1555 (1945) (Chemical Composition of Material used to German Ammunition)

Propellents: Artiflery. According to H.H.M.Pike, CIOS Report 31-68 (1946), pp 4-8 and tables, the following types of propellents were used by the Germans in their artillery

A propellant vers used by the German in their stillery versponts:

A. Hitpseelisten (HC) Propellant conjugated as Napp (All Hitpseelisten (HC) Propellant conjugated as Napp (HC) was a seed as 105 and 1jahr field towitzer.

105 and light field towitzer.

10 Mishem (Hitronalistone Mandrer Rudelpaiver) was used in the seed of the s

3) MgPIP (NitrogFyzeria Pitterbespulver) was used in 33 ma intantry gin 18 and in 73 mm. tank and action 23 mm. intantry gin 18 and in 73 mm. tank and action 25 mm. intantry gin 18 mm. interpolated was used in 10 mm. bears matter with a 18 mm. interpolated was used in 10 mm. bears matter with 23 mm. Navy gan C2/4, 73 mm. monetque gin 15 mm. in 15 mm. Navy gan C2/4, 73 mm. monetque gin 15 mm. in 15 mm

210 mm mores;

o) Deiglie (Digirkel Röhempelver) was used in 37 mm AA gaus, 57 res. A77 gams, 42/22 mm uspens-bee gam, 50 mm A72 gams, ang 77 5 mm Anny gams, and 28 nm 105 mm, 128 mm, 149.1 mm Navy, 130 mm Anny, 172.6 mm Navy, 130 mm Anny, 172.6 mm Navy, 130 mm Navy, 130 mm, 13

star shell amon sua shell amos

E. Mirrepumidine (MGu) Propellant, designated GuP
(Gudolpulvar), existed in the following varieties:

a) Gudiff (Gudol Blattchempulva) was used in 50 mm

in many suc 33, 150 am heavy howites: 156 am heavy heavy howitzer for forcification;

b) GeRge (Gudol Ringoulver) reas used in 210 no mortact 18

To compete the control of the contro to overcome the by proscopicity

Table 47 gives composition and some properties most cosmon artillery propellants used during WW II the Germans- (See following pages),

Propoliums, internal Balliotte Date is given intables at the end of CIOS Report 31-68 (1946).

Propolients, Rocket, See Rocket Propolients

Prepallents, Stability of The ambility characteristics of some German propellages were determined during VW II at Picatinay Amenal and described in Technical Renort 1456 (1944).

in cases where sufficient material was available, both the 120 and 134.5 Heat Texts were made. The results 'of teats showed a tendency toward greater asability for those propullants which contained a stabilizer-relatinizer (such an centralize) in combination with another archilizer. such as acardite.

Sufficient amounts of propellants were not available for exacting a definite conclusion concerning the merits of disubstituted prethenes in combination with acadite-Propellants rootsining NG, DEGDN and NGo-DEGDN proved to be of auta-actory sentility, judging by the 120

Heat Test of the U.S. Army (the test paper should not turn a salmon pank color in leas than 40 minutes).

As m the suggle-base propellants, only a few of the German properience met the U.S. Ameri-Specification which requires that the treet paper in the 134.50 Heat Test saids not rum salmos punk in color in less than 45 minutes.

Propellers Charge in Fixed and Semi-Pixed Assumption. According to E.Englesburg (The Ordnance Sergent May 1944, p. 21), German propelling charges may be abditivated into two main classes:

s). Class No 1 (Fixed round) used flaked and mining propellanm. In this case, the gruins were packed in a silk bag with an igniter bug sewed to the ead facing a SILE Deig with in (Saiter Prg sewed 0) the end facing the primer. With subsing grains, they could be either packed in a silk bag (as above) or tred, in a buselle by means of a fine venue. The lower end of the bundle of tubes was placed in a more silk bag, which had sewen in its Docom, a roarser silk bag containing

ignies composition
b) Class No 2 (Semi-fixed round) consisted of base and increment charges (zones) contained in aille bags. An ignirer bug was sawn to the base charge. The charges were shipped inside the cartridge case and if there were too many increments for the desired range some or were too may increments for the desired range some or uli increment, but not the base charge/outle be removed; deviced thing) and aubstituted by the "instance piece" of v. b. in a paralboard pr. seenli container, was provided. in a paralboard pr. seenli container, was provided. Some propelless charges had a bay with a finals reducing agent (which was placed becreen the propellate; and pre-jectile) while others had a decoppering agent such as lead was warped account the lag.

Propollent Grains and Thele Dimensions. The following typical German propollents are listed by H.H.M.Pike in ClOS Report 31-68 (1946), pp 4-5 and tables:

and 0.6 mm much

and U.5 num cure; c) Flake, (Blatcheupulver), designated am BIP (3 x 3 x 0.8). consisted of grains 3 mm long, 3 mm wide and 0.6 mm thick
d) Diac (Plattchenpulver), designated as PIP (50 z0.2), consisted of discs 50 am in diameter and 0.2 mm

e) Ring or ensular (Ringoulver), designated as RgD (0.2 x 50/10; consisted of grans 0.2 am thick, 50 mm in diameter and a central hole of 10 mm in diam

8 28 50.5 33.49 39.55 Ordate)

,				Compositio	s, %				
Form	NC -	NC.	NG :	DEGDN	Cent	Graph	Other Ingi	edients	Uses
Cord /	99.1	15.1	-	1 1		. "	DPhA	0.9	20 mm Solothura
Grains	91.3	13.0		5.2	1.0	0.3	Kauliaco	0.9	37 mm Solothurn
	1.						Unsc	1.7	37 MM APHV
Bog	89.6	12.4		9.6	0.8		Disse	1.7	2
Graine	91.4	13.0	17 - 1	6.0	0.6	1 (0)	Camphor		37 mm APHV (Bag)
	4		1	7.0	4.0		K sulface	_ 0.4	37 min APRN
	1	1 .	1	,		1	Unac .	0.3	
Beg	88.9	12.4	1	10.3	0.8		COME .	1.3	
Cord	92.8	17.7	3.2	100	1.9	6.5	DPhs		37 mm APRN (Bag)
	74.0		1 /-	-	1, 8.79.	0.3		0.3	37 mm HEHoC
Grain	^ 85.6	12.9 -	1 .	-10.3	1.0	0.9	Urrac	1.5	
Grain	89.5	13.0	1				Unac	2.2	42/28 mm APHV
CHECK	05.7	1,2,4	1. * - 1	7.2	- 0.9	0.4	Umac	2.0	42/28 mm AP
Cord	88.8	13.1	t l	4		1			Topered Bore Gua
Cara.	60.0	13'1	1 - 1	*, :	6.8	0.35	Acas	0.15	50 aun APC
							. DNT	2,6	
			1	-	i .		K nakta	8.0	
			1		'	1.	Unac	0.6	1
Bag	91.0	12.3	6.1	*	1.8	- '	DNT	1.1	50 mm APC (Bas)
Gmine	92.8	13.0	1. * 1	4.3	0.4	0.30	K sulfate	0.45	50 mm APC.
	1	1	[ · · · ]	100	1	,	Unac	1.75	
Bog	90.4	12.3	1 - 1	., 8,7	0.9	i	* 3* 5	,,	50 mm APC (Bag)
Grains .	88.2	12.3	1 . 1	7.0	2.5	0.50	K sulface	0.3	50 mm APRN
			1 1		Ī		Upac	- 3.4	70
Bag	88.9	13.0	11	. 10.3	0.8	1 -	•		50 mm APRN (bag)
Graine	87.7	12.9	- 1	7.9	1.9	0.40	Camphor	0.7	SOmm APRN
-	1		1 1	1		1	Unac	9.7 1.4	775
Bag	89.1	12.4	1:	10.0	0.9	1 -	_		50 mm APRN (Bag)
Grains	91.3	13.0	I ~ i	5.0	0.9	0.25	K nulfare	0.5	50 mm APAN (Dag)
			1 1	1.0	4.7	,,,,,,	Unac	2.05	, JO min NE .
Bag	.96.6	12.6	I I	12		1	Unac		an amount .
Cord	83.4	13.1	1 . 1	11.7	1.5	1.0	Unac	3.4	50 mm HE (Bag)
Bag	87.9	12.6	ا د ا	10.8	1.3		DATE.	2.4	75 num HE HoC
Conf	88.7	13.1	1:1	6.6	1.4				75 nm HEHoC (Bug
	1	13.0	1 ' 1	0.0	177	0.5	Unsc	2.8	75 mm HE,A/T
Cord	77.3	13.0	1 1	18.8		(intorp)		,	(Pak 40)
Grain	89.1		1 - 1		2.6	0.5	Unic	, pos	75 mm APCLC
CERTIF	69.1	13.0	1 . 1	-7.3	0.7	0.5	Unac	. 2,4	76.2 mm A/TGun
Cord	90.7	12.9	1.4		l	Į.			(Captured Russian)
Core	90.7	12.9	1 - 1	5.9	-		K aulfare .	0.4	88 mm HE
			1 1			:	Unac	. 3.0	
Cord	92.7	13.1	1 - 1	1.7	1.3	-	K nitrate	1.3	88 aun HELC
2.17	1		1 1			{	Danc	3.0	· ·
Cord	89.1	13.0	5.15	, 2.1	0.8	-	* Acar	อ.ฮ	100 mm Gun (1, 16)
	1		1 1	r	ĺ	l .	Unac	2.1	(Charge 1)
Square -	56.7	13.L	32.1	, 7.0	0.6	-	DPhUret	0.8	100 mm Gun (K 18)
	1		1 1	- · P	1		DEtUces	0.5	(Charge 2)
	1	ı	1				Unne	2.3	
Bag	34.9	12.1	63-1 (or	-1	0.8	_	Upac	1.2	100 mm Gun (K 18)
-	1	1 .	DEGDNO			1			(Bag)
Square	61.6	13.3	3 -	36.8	0.4		Acer	0.3	155 mm How
,	1	1	ا آ." [	,0.0	0.7	ì	Unac	0.9	LOW NOW
Bag	73.4	12.4	23.0		2.4				144
ong.	84.1	12.7		2		-	Unac	1.2	155 mm How (Bag)
	O4.1	142.7	10,0	-	8.0	-	Acar	A 2.4	210 mm Rocket
	1		1 1			ı	Unac	12.7	Igniter Ped

Abbireyintimus: See under table 44

Noise: Due to the difficulty of ignating propollants containing DEGDN and NGs, the ignitera for these materials consisted all NC of a high degree of situation with not more than 5% DEGDN.

f) Nodular or moodle (Nudelpulver), designated as NP (or NdP) (1.5 x 1.5), consisted of grains 1.5 cm

ner tor rotr) 11.5 x 1.5), cobaisted of grains 1.5 cm long sed 1.5 mm in diameter.

1) Long (Languairer), used for Naval star shells and ceipspared as Lg? (480 x 3.5/2.8), countated of mbolar grains 480 mm long having external and unterval diameters, of 5,9 mb and 2.8 mm respectively.

grams our mn iong naving external and internal diameters.
of 3.0 mh and 2.8 mn respectively.
(See also Table 45 of this book where web dimensions and ballistic characteristics of typical German propellants are given).

Propollant Ignitors and Propollant Ignitor Bag Compositions. According to the work conducted at Picatiany Arrenal during WV II most of the base (containers) used for propellent igniter compositions were made of colloided amokeless propellest meterials. The same inventigation showed that the propellent ignites compositions may be subdivided into chree classan:

a) NC-NG composiziona (

b) NC-DEGDN compositions and

e) Black powder compositions,

Table 48 gives the composition of typical propellent ignicers, classes (a) and (b), and of their containers (bags). It is to be pased that the values thall be considered as only approximate because there was a possibility that some of the NG or DEGDN volatilized and passed from the propellant to the bagos vice versa. (See servious page).

Some propeitant igniter compositions of Class.c (black poroses) are given in Table 49

			position, A		
	Form	ENO.	Salfer	Charcon	Uses
i	Grain	75.9	9.5	14.6	20 mm Inc
	, Grain	77.5	9.5	13.0	20 mm AP
	Grain	74.9	9.9	15.2	20 - HR
J	Gmin	74.7	8.96	16.84	17.ma APE
1	Gmia	76.3	9.8	- 16.0	47 mm APLN

Abbeeviations See under Table 44 .

According to Ref 4, per al "the propellest imiter conpositions mountd he the Dinebers Fabrit D A -G contain ed: NC (135N posters) 54-39, NG. 44-51, Acadice 1.00, MeO 0.05, and 1G Furbon Wax E 0.05%. Oxygen balgace + 10.96% and enterific value 1284 keni/kg.

According to Ref 5,000 type of Germen igniter for pronelliante consissed of NC (13.15%N) 75.8, NG 24.0, and DPAA 0.2% E clarence #1

1) Picatinay Arsenal Technical Reports 1282 (1943) and 1456 (1944)

2) PB Rept 11,544 (1945)

3) Pic Aren Tech Rept 1555 (1943)

4) PB Rept 7826 (Technical Intelligence Rept 1-70) (1945) 3) J.Corner, Theory of Internal Ballistics , Wiley (1950,

## Propoliont Subattrutes. See Treibentue.

Proving of Assessation and Woopens, Preliminary testing Praving or Assumation one Wespean, Pratissinary testing-was fonce as proof-ranges, sainched to meet of the explosives, -amountaine or wespean placks such as those of the Dynamic AG, which was the proposed placks from the saince (acceptance) to the contact of the saince of the saince (for the Army) or at the Mappen (for the Navy) Powing Grounds.

Nost of the German proof ranges were built in the form? of a V, the gas being placed at the point of intersection, so that it could fire into one butt while the other was being prepared. The officer to charge use in an upseuser office behind the sun and overlooking at. The LeBouleage chronographs were in other buildings further back and results were sent to the officer through a pipe conveyor system. The LeBoulenge screess were usually placed 10 a

system. The Léboulez & extreme were usually placed 50 a apart at apprentantly 10 and 70 m from the gas.

In grood procedure for a propellant was to fire at its comparison with a standard propellant, using 7 records on the comparison with a standard contail but was 30 come. The firing to supersture was 10°C and to was 30 come. The firing to supersture was 10°C and the comparison of t Chamber pressures were measured by copper cylinders

(creaper gages). (crusher gages).

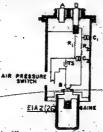
The proof procedure for a gue was to heat a Service propelling charge to 35°C and use it in the gas being proved, attempting to develop a pressure (design or true pressure) of about 300 stm (sq tons/sq is) shows the proof pressure, an measured by a copper crusher gage. For the Adolf gun the pressure above the proof pressure, was only

150 sim(1 ron/sq m). Reference: H.H.M.Pike, ClOS Rept 31-68 (1946), pp 10-12.

Prinzini'ly Fuzu. According to Til 9-1985-2 (1953), three expec of proximity haze, for use in bombs, were developed in Germany; the Acoustic, the IR (infra-red) and the Electron

ic.

Among these the Krenich (briefly described on pp 216-17)
was accusate, the Medrid (developed by Kapka of Vienes and mentioned on p 232) was infrared, and these were also electronic fuses developed by the Telefuntes Co and others. Several other names of proximity fuses are mentioned on p 229, such as Kekedu, Marcho and Fusha, but the type of such of these was not stated.



A different type of proximity fuze is described in TM Ey-1989 (1942). File N 2322.6. This book designant. as ElAZ (26), was tribindical in shape and contamed the charging plun gers A and B (autrounded by insulating material). a chatgar-conference C1:10 filing-condenser C2 , resistances
R1 & R2 , as igniter bridge IB, a trembler novech TS and an air pressure switch. The latter switch consisted, of a fixed and a movable place. The awarch was placed punt inside of an opening in the fuzz case and was aligned with the air rube leading from the nose of the humb C250

Flam. (See drawing).

The base of the lune case was threaded to receive the game, which housed the primer (containing a match composition and black powder), the detonator (containing lend and de/lead styphnate mixture over PETN and PETN/wax) and the booster (picrie scid).

Before the bomb was dropped from a plane the current from the plane batteries passed through B (planger A was a dummy) into C, and at the release of the bomb the current a dummay) into U., and at the resease or the motion the current leaked showly through R; to C; where it accumulated. An the bomb approached its target the pressure of air, and the true leading to the pressure switch pushed the inovable place of the switch towards the fixed place. movement prime of the awaren commons the riked plate, thus clossing the execute through IB and fixing the game and eventually the mans charge of the bomb.

If the pressure tuse should fast to operate then the

trembler switch TS was supposed to act on impact come.
Note: According to U.E.Rogens of Picatiany Arsenal, this
type of fuze could be initiated by the air burst produced by other bombs exploding in the vicenty and this would be undesirable if the bomb was not yet close to its carget. On the other hand this property of the Juzz could be used to intentionally produce our burets of bodies by dropping

Premimity Fuze, Electric, ELAZ (26), Sen under Premimity Fuze. Pudal (Pandle). An acquetic homing device intended for the control of some guided missiles, its construction was essentially the same as for the Eignich acoustic proximity

Reference: TM 9-1985-2 (1953), p 217. Pull Type Igniew (Zugninder). See under igniter.

Pulver (Powder) - See also Propellant,

Following are the principal German abbreviations used to designate various types of propellants;

s) Pulver Digl (Typ Digl). A double-base propellant

coneg as principal ingredients DEGDN and NC b) Pulver Go (Gudel). A triple-base propellant con-

eleting of NGs, NC and DEGDN c). Pelver Nel (Typ Ngi). A miple-base propellant

consisting of NGu, NE and DEGDN d) Pulyer No (Typ Nz). A single-base (NC) propellant

e) Pulver OL (Pulverjohne Lösungeminel) A solventiese f) Blitrehampulvar (BIP). A leaf- or flake propellant

g) Ringoulver (RgP). An annular propellant, conembling 6 Washer

h) Rührerpulver (RP). A tubular propellant i) Streifengulver (StrP). A strip propullant

j) Worfelpulver (WP). A propellant in small rectangular tablets; it is called! sometimes | cube-cut propallant. Reference: Tis 9-1985.

Pulvernouse G . A double-base propellant containing K oulface as a flash-reducing agent.

Pulvemerellurgie (Powder Metallurgy), The technique of powder metallurgy was applied on a considerable scale during WY II, chiefly in the production of carbide tools and defining www ii, caseziy sin one production of carrows cools and some ammunication and weapon components. For instance, the following astrictes were manual from sintered iron or streel whell driving bands ranging from 20 to 210 on in calibra-tical bands are some street of the control of the con-street of the control of the control of the con-trol of the control of the control of the con-ponents, BIOS Final Rept 393, them 21 (1983).

notellurgle (as practiced by the DPG). A jet of solves som together eith a stone jet ol-ser vers andere som together eith a stone jet ol-ser vers affected againet. A fast totating horizontal diec enclosed in a cylinder having a consist-form provided with an entire. The trauling-product, powdered tros slightly onthest on the surface, was disced with a small amount outdissed on the surface, was disacce with a sensit amount of yellow lead outde and give reduced in an azimosphere of yellow lead outded and give reduced by this process the son particles became outdoor. By this process the son particles became outdoor was used for the preps of sarriers and other nest-prior. This prouder was used for the preps of sarriers and other nest-prior of the property of sarriers and other nest-prior. Private commonication.

Pulwitt of Serlin passented, in 1895, the following permissible explosive: Am nitrate 92.0, phenanterene 5.5 and K bichromate 2.5%, | Daniel, Dictionnaire, Parts (1902), p 659 1.

Puppehen (Dolly), called itse Wheeled Boroske was a carriage-mounted 88 mm stocker launcher with breech-block it used amountion containing the same shaped-charge warhead as the Ponters threek (Olonrohr) but with a shotter rocket motor body, it was fired by means of a propellant contained in a castrage placed in the breech. The flash from the carridge smited the rocket propellant and the missile proceded towards the target Reference: Intelligence Bulletin, March 1945 p 14 (See



Pyrofulmia . See general section,

Pyrolit (Pyrolithe), According to Naoum (821 1) Pyrolit. was a type of explosive prend from smokeless propellants left over after will. The finished product also, contained 5 to 12% gypaum and ht least 18% moisture. Pa nitrate and/or K perchiorate (max 30%) and TNT (max 15%) were sometimes incorporated in Pyrolit.

J.Pepin Leballeur (Ref 2) lists the following con positions, called pyrolithes: a) Ballistice 74-76 and No nitrate with or withder

KC10 26-24% b) Ballintite '40-42, K chlorate with or without Na

nitrate 45-43 and aromatic nitrocompounds 13-15%. Note: The aromatic nitrocompounds of the last composition. should not increase the sensitiviness to short to say extenter extent than the addition of 13-15% TAT. References: 1

1) P.Nabum, Nitroglycerin, etc., Baltimore (1928), p 451 2) J.Pepin Lehalleur, Poudres, etc., Paris (1935), pp 457-6.

Pyroschiller divertized aluminum intended for one in pyrotechnic compositions. It was required that the encisture content be 0.4% (max), and fate 0.6% (max).

Kast-Metz, Chemische Ungersuchung der Spreng- und Zundscolle, Vieweg, Braumychweig, (1944), p 516.

Note: According to TM 9-1985-2 (1953), p 82, the Proschill was an eparemely line, low density linked aluminom the product having the following characteristics: Al metal All-popular having the following characteristics: Al metal content of the property of the content of the conten

Pyrotochnic Arthromfinder Devices, such as the 15 cm simulator rocket and Mark 50 cascade flare bomb, were employed as a counter measure for the Allies' Pathinder Bombing (q v ). The German devices were intended to confuse the raiders by islam as again which closely resembled the signals emptoyed in the Pathfinder aystem. The devices were inunched tone the air by means of rockets, or were dropped from planes about 5 miles away from the

true targets and over unimportant terratory.

Against the daylight miss each rocket was equipped with either three mode flares or with about 300 peliets designed to produce black mode trails. Against the night raids there were many different arrangements of colored it was reported that the German devices were used as to designate. Incling littled to the Latwerie pilots and assaulted of Allied air strucks to Flas barreries and Latwerie flighten pilots.

Following is a brief description of some Antipathinder

devices: A. 15 em RSSG (Raketen Scheinschussgerich) Rocket A. 15 cm RSSG (Bakeren Scheinschussaemit) Rocker Signal Simulating Device) was constructed of two sections: the rocket motor tube and the rocket head

the rocret motor tube and the rockes send

The tube continued arena 2 lb micks of NC-DEGDN
rocket propellant, while the bend contained a pyrotechnic
charge such as:

1) \*\* (Fallechim) Pureness (Parachuse Flaze Car-

1) To "(Falleshima). Februeon (Franchive Flaw Carindiges) which contained, among other Townig the red,
Fee instance, the red flave carridge consisted
of the following components:
a) First fire (1.5 g. of black powder)
b) letermedize (1.5 g. of a minter of K mitrate 46.2,

c) Igainer (17 g of a mixture of Sr atture 61, PVC 22 and Hg 17%)

Mg 17%)

d) Red there (6.7 kg of a minute of St airrate 60, CPVC 18, Mg 18, 16 was 3 and waspling 1%). Burning time 5 minutes.

Other flares had the following compositions: Green flore. Be mirrate 60, CPVC 20, Mg 17, IG was I

and vacaline 2%. Burning time about 5 minutes.
Velue fine Ne situate 45. Swammate 2, htg/hi allow
(50/50) 40, wood ment 3, its wax a and vacaline 2%. Burning

(40)50) 40, wood mean 3, ju was non termine the mind 3 manters and the mind 3 manters (53); K nimitice 8.00, Al 273, S. 4.0 mind 5 manters and every limit 10,700, Benning time 5 matters and every limit 10,700, Benning time 5 matters and of the intermediate and the limit 10,700, Benning time 5 matters and the mind the mind 10,700, Benning time 5 matters was character for all flarms, bas the inpution companitions were as follows:

For green flarm: 17 g of a minter of Ben niverse 60, CPV C73, Mg 14, 10 man 1 ond vandiline 279.

For yellow and within flarms: 17 g of a mintere of Ben niverse 62, Bel limited 6, S 10, Al (lakes) 10 and niverse 63.

At (grains) 1%. The curtridge for the green star consisted of the following

The composition for the first star was: Sr nitrate 60 Mg 24 and CPVC 168). The first fire was the same as for the green star, but the intermediate contribued: Ha nitrate 31.2 K nitrate 15.4, At 10.9, S 11.7 and black powder

20.8% Note: of the intermediate compositions containing black powder and sulfar, were replaced, in 1945, by minutest costs triganisecembasels, K signate and Ai and the reason for this 1s exclaimed moder Termaiwocaebasel (TeNCbs). (Kuskada) Parranan (Gascade Cartridaes)

commined flares (green, red, yellow or white) without

parachutes.

The following combination was used for green flure:
a) lgniter() g of black powder)

12 d and missure of K nitrate 34

b) Intermediate (7.5 g of a mixture of K nitrate 34, TeNCbs 34 and Al 32%.

7 Green flare [520] g of a minimum of Ba airman 61, CPVC (65% Cl) 21, Mg 11 and IG was 7%] Sauraing time 2 minuses and cardlepower 100000. Note: The composition of the red flare was: Sa singuis 62.5, Mg 153., CPVC (63% Cl) 18.0 and IG was 6.0%. Burning time ? minures and candlengwer 10000.

3) "Rx" Rough Petronon (Snoke Carridges) counsined three snoke cradles (Nebelhersen 398) consisting of a mixture of HCE 40, Zn-dust 50 and Ba sittate 10%. Buming time I minute.

4) Black Smake Costridges, which contained about 500 amoke producing pellets of the following composition: HCE 61.5. Mg 18.5. methracese 8.0 and applitudence 12.0%. The ignites train consisted of a black powder and so ignition composition continuing K sitted 24.0, HCE 24.6, TeNCbx 18.0, unthracene 5.6, unphthalene

2.4. Al powder J.S.O and Mg powder 7.4%. Act. As powder 35.0 and ag powder A.5...
Act: There were two types of 15 cm RSSG nockets (1 and
2). Type 1, was equipped with a delay ignizer V-22 (q v )
which was lived by the hot games from the propellant,
while type 2 was equipped with the electrical ignizer for the rocker motor tube and was ignited separately.

"B, 13 cm RL 05 (Raketen Leutdrawsk Schlaggruchous Rocket Humidain, Simulating Davics ) was an improved version of the 15 cm 48556 rocket. The RLGS rocket used lame of the tollowing types:

Hame of the indowing types:

1) Single rolps fines: fed, green or yellow

2) Red, green and yellow filters which bout 2) seconds.

For, instance, the green fines: carriage constanted of
the following inems:

a) First him (1) of black powder)

5) Intereseding (3.5 g of a mixture of TeNChe 30, Al 30 and K nitrate 40%) e) Igniorr (20 g of a mixture of Be nicrate 60,Mg 20 and PVC 20%

and PVC 20% d) Green flore [1.15 kg 5/ a mixture of Ba nitrate 57.5, Mg 7.5, Mg/Al niloy (50/50) 6.5 and PVC 28.5%.

Bitming time 4 mustures ].

Bitming time 4 mustures ].

Per litares which hursed, with the ejection of surer; the composition was not the mane as for ordinary filares.

For instance, the green flam, employed for ejection of stars contained: Ba sicrace.53, Mg 25, PVC 20 and graphice 2%. The corresponding stars contained: He nitrate 55, Mg 18, PVC 25 and graphics 2%.

The composition of other flares and their stars in given on no 27-29 of the Reference

C. Merk 50 Keskede (Cascade Flare Boothwas employed to moniate the tascades' of the Pathington system assed by the Allies, it consisted of a cardoned case filled with about 67 randless. Each candle barned for about 2 minutes with sither a red or green flason. The composition minutes with sither a red or green flason. For composition X-Ke" (Kaskado) Patrones and destribed for item Al-Natewistons: CPVC Chiomisate Johyson Christian (Patrones CPVC Chiomisate Johyson Christian (Patrones CPVC Chiomisate Johyson Christian (Patrones Charles) (PVC Polymylchelmet; PRCE Teramine-cahana).

Reference: H.]. Eppig, Pyrotechnic: Antipachfinder Devices, CIOS. Itum Nos 3 & 17. File No 32-56 (1948).

PYROTECHNICS - (Fenerwerkerei). The compositions of various pyrocechnic devices in use between WW I and WW II were given by Langhans (Ref 1) and Lenze (Ref 2). The latter investigator also described various tests applied to pyrotechnic compositions, such as Entzindlichkeit ( (ignitability), Entzundungstemperature (ignition Temperneure, bertredtrebrett gegen Schlag und Reibung (Sen.

situreness to Shock and Friction), Detonations gretch windig keit (Velocity of Detountion) and Brisanz (Stiannee). A brief historical description of the development of

the science of pyrotechnics to Germany is given by Lotz (Ref 3). Maro (Ref. 5) lines numerous German pyrotechnic

projitione on tan be seen in Table 30. (See next page).

Toble 50 Pyretechnic Compositions

							Co	mpone	010					
Designation	Chlora			se of:		Al	Mk	s	Sr `	Zı		Other In-		Reference
	Ba	K	Ba	K	Sr		-8	L			lac	gredients		re tese pes
Goren Stat	64.0	18.0	-	- `	- 25	٠-	-	l	-	9	18.0			5.p 211
aignal			1				1	1		1	1			
Green Light	-	-	58.0	-	٠.	-	7.5	( -	- 1	-	-	PVC	22.5	5,p 211
(1946)		١.	1	1	1 1	l		Ι'		1	ı	Sı	7.0	
	· '	Ĺ	l		Ι.			l				Res Ac	5.0	re.
Signal Light			57.1	- 1	1 - 1			19.1,	1	٠.		1800		5,p 212
Signal Light	-		57.2	-	1 -	-	٠.	10.7	٠.	٠.		Charcon	10.7	5,p 212
Signal Light.	-		66,7	• (	1 *	١.	1 -	1.7.	1 -	1 1	22.2	2"	. •	5,p 212
Signal Light		36.0	40.0	- 1	٠.	1.	-	24.0	-	-	٠.		-	5,p 312
Signal Light	61.1	-		٠.		٠.		10.8	-	٠	1	Charcoal	2,7	5 p 212
	1.	32.7		1	ì	100			1	ı	1	Calomel	5.4	
Signal Light	-	32.7	52.3	٠.	-		-	9.8	-			Charcoal	5.2	5,5 212
Ignition	-	-	16.0	16.0	١.	10.0	٠.	8.0	-	١.	1 :	Bilick powder	50.0	5,p 221
Composition	1	ł			i .	i	ı	1.	l		۱ ۹	-107		
** , 0				46.0		11.0	] -	f1.0	i -	3.0		Black powder	29.0	5 p 221
	l - ]	-		40.0	. 4	30.0	-	-	·-	٠- ا	٠.	TeNCbs	30.0	5,p 221
Green Stat	1 - '	1 -	58.4	l	1	J	8.0	1 - 1	7.0	١.	1 -	PVC	22.0	5,p 228 - 9
Signal -		l	1		- 1	1 '	1 .	1 .	1.	!.	J	Gallic or		1 2
	1	i	1	}	ş.,	!				1	-	Res Ac	5.0	
Green Star	1 -	١.	55.0	1 .	-	-	16,0	٠ ا	۱-	ء	₹ .	PAC	29.0	١,
Signal	LΛ	1 .	Ι.	l	1	1	1			1 ·	3			Ι.
Red Star	16	٠ ا		: -	55.0	1	28.0	l	1-5		1 -	PVC	17.0	1 "
Signal	17 .	1	l	١.			1	1.		ł	1	1		1
Red Ster	1/10		٠.		50.0	1 :	32.0		-	٠.	1 -	PVC	18.0	7.1
Signal			Ι.	· ·		1 1		i		. 1	1	· .		l
Red Scar	86.0	Γ.		L -	١.	16	-	1 .	-	۲,	11.0	Carbon	5.0	- 5 p 229
Signal		1		-		1	L_	L'	L	1.	1			

Abbrevistions: PVC Polysiavi chloride: Res As Respeculic acid: TeNCha Terranitrocarbasole.

a) Detection of flame for a 12g scar signal was about 7 seconds

b) Fir igniting each star composition of the signal about 1 g of black powder was used. This in turn ignited about 1 g of the intermediate mixture containing K nitrate 30.6, Be nitrate 39.1, carbon 9.2 and Al 21,1%.

to the article by Goldenson and Dannet (Ref 4) the following compositions are luxted:

A) Hand anaka alamaks a) Red: K chlorate 17, Inctone 24 and o-methoxyphenylazo-bera-ampthol 59%

b) Blue: K-chlorates 30, Increase 20 and 1-methylc) Greent K chlorate 29, lactore 24, 9 10-dissilino

anthracene 30 and 1-methylamina-4-p-toluidinosathraaujaque 26% (Adda to 99%)

d) Violet (Rnuchbindelpntrose Vidlett): & chlorat 25. 1 methylonino-4-p-toluidinonnthrequinone 45, luctone 50 and "Rhodamine B" 10%. It was fired from a Very-type pistol to produce four streaks of , bright violet smake.

B) Whistling cortrides (Pfeispatione) Contained ewo minamere

a) Be nitrate 55.5. Al powder 35.5 and sulfur 9% b) K chlorate 63.5 and gallic acid 33.5%-(Adds to

None: Mixmee (a) were for producing light, while mixture (h) produced a whistling sound. The cartridge was designed to be used as a yes attack vacaing.

C) Frangible grounds which produced a white screening ampke by the hydrolysis of titanium tetrachloride with water in which was dissolved 27 perts of Ca chloride (to prevent freezing) D) Tank-nun amoke-acreen projectule which contained

oleum adsorbed on pumice. Another Projectile was fill ad with solid SU ..

Additional information, given below, was obtained from Refs 9-17: A. Pyrotechnic items of Ref 9 are discussed in this work

under incendiary Compositions and Snoke Compositions. a) LC 50 flares, 8" diameter

b) Ground flates 4.5" diameter

c) Self contained signal rocket d) 2 star red signal, hand operated by a pull igniture. C. Prestechnic stems of Rel II are discussed to this work under Syrotechnic Antipathfinder Devices. D. Printechnic stems of Ref 12 are discussed in this work E. Pyrotechnic items of Ret 13 include the followings

n) Compositions for the different colored candles used in Mk 30 haskade Bonke include Red: Sr niwate 36. an Mr. 50 American normal statute. Red: Sr nitrate No. Mg 16, Igelit 21 and 16 gent 75; Green: Ba nitratife No. Mg 16, Igelit 21 and 16 wax 75; Vellow: He nitrate 16.5, Mg 15, Cripalite 8,5, IG was 4. Igelit 6 and Caosalate 57; White- Ba nitrate 59, Mg 11, Konstane 21. IG was and and gelit 3

b) Flare composition used in the ground flare, Bodes-levekte (P) #756277; kg (granalio) 346, Na sizzas 11.3, 12.5 km sizzas 11.3, consistent of the sizzas consisted, of Nav sizza composition near the ship sizzas consisted, of Red light composition for ship sizzas continued it Red light composition for ship sizzas continued of Red light composition for ship sizzas continued processition of a safety of pistols, etc. A upical cap composition of a made by mixing K chlorate 70, Monaphoras 10, Prosecution imms of Red 17 lands/s the sources' (a v) and some flowest compositions such as Bengal upit and was the compositions.

H. Pyrotechnic issum of Ref 16 include the following red colored light mixture used for atgnatling: Se nitrate 30-61, Mg 17-35, polyvinyl glionde or chlorimated paly-yaryl chloride 14-28 sed vaneline or synthetic war 1-38. L. According to Ref 17, the Germane made arent nee of kieselgahr as so extender for expensive organic dyes and aye intermediates used in their pyrocechnic compo-sitions. Kalestoncomi

2) A.Longhano, S.S. 12, 54-36, 43-45, 61-62, 68-70, 77-78. 90-93, 105-206 (1922) Lauchmanus(Pyrotechnic Compositions) 2) F.Lenne, S.S. 27, 366-71, 406-9 (1932); Ibid, 28, 14-17

3) A.Letz, Das Feuerwork, Hiersemann, Leipzig, (1940). 99 19-45, 86 & 89-103

4) LGoldenson & C.E.Denson, Chem Enganteres 26, 1976-2 (1948); CA 42, 6116 (1948) 5) A.Ime, Pirotectia a feechi scificiali, Hospii, Milano

D(1950), pp 211, 212, 221 & 227-229 6) F.G. Haverink, Pic Aren Tech Repe 1440 (1944) (Tank

ameter candles, NhK 198) Fi F.G.Haverlak, ibid, 1505 (1945), Airmett colored smoke

8) F.G. Haverlak, ibid. 1519 (1945), Calared smake signals 9) E.V.Bateman, CIOS Report 32-13 (1945), Production of Smoke, Inconducty-and Ehemical Warfers' Venpons 10) C.G. Bridge, CIOS Rept 32-27-(1945), Gennae Pyrometrics.

10) C.D. Bridge, C.G.C. Pheps 22-27-17-17-2), Lemma Pyrumelaid, Regis 22-26. (1945), Pyrosechaic Agri-Roy 12-56. (1945), Pyrosechaic Agri-pachfisher Dyricos 1, C.O.S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Walless and Monicional Springer, A. O. S. Rept 33-20. (1945), Downtone Wall

19) P. L. Liboum. of Controlland, DUS Final Rept 1936, 1946, Genes Pyrotechief Factories.

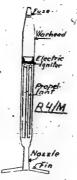
14) C.G.Dawies et al. BIOS Final Rept 1594, (1946), Some Gramon Pyrotechief and Paper-Simes. 1947, T. M. Bennert, BIOS Final, Rept 1311, (1947), Centrolland Controlland Controllan

16) T. Urbanski, Przemysł Chemicsov 27 (4), 487 (1948) Progress in the Field of Explosives Dusing the Past Decade (Translated from Polishly Dr. Ivan Samon) 17) J.Kanegis, upB Rept 102/500, (1951), Colored Smokes (General discussion and some bibliography).

(See also under liturerating Compositions, leconding Compositions, Fracer Compositions, Smoke Compositions, Signal Devices, Flares, and Antipublisher Pyrotechnic De-vices L

## Quellingsgrad Swelling Coefficient). See weneral section.

R-Mi. A 2 inch solid propellers rocket, which carried about 1 ib of a HE and had tail surfaces that bledd be looked back. It was mass produced towards the chil of folded buck, it was mass produced lowards the each at VW II. by the Destacks William and Massacrossishiles at Lisbeck. As many as 48 of these cassales could'be casted on the undersume rocks of a lighter plane and lime? Perceivally simultaneously against a bomber formation at Wanage of 1200 to 1500 paried, it was claimed that a single hit with such a rocket was sufficient to bring down a bomber.



Reference: V.Domberger, V-2, Viking, N Y (1954), p. 270. beier Accreding to Party.

Minnile, Tilly Spirit Sp

Ruder Guldence System for Missiles. See under Guidence Syamme for Missiles.

Radio Command Guidence Systems. See under/Guidence Systems for Missiles.

Rehere - See Rocker

Rakstenperzerbieben. See under Venponn, enliber 88 mm.

Reketerwerfer. See under Tempone, enliber 88 mm.

Remists, See general section, Some information on German ramists is given in CIOS Rept 31-13 (1945).

Reachig's White Powder (Veisspulver) (See also Reachis) A cheap blasting powder prepared by E.Raschig in 1911 as follows: A concentrated solution of a mixture of 65-70 pater

of Na nitrate and 33-30 parts of Na cresologiantes was run in a thin stream onto a rapidly recating dram beased by high pressure steam. The thin layer of dehydrated material which formed on the surface of the drum was accepted off in the form of linkes which were packed in waterproof paper cateridges. Composiziona parenced in 1912, consisted of: a) Na nitente 68 and

"Zellpech" 32% and b) K nitrate 70 and Zellpech 30%. Note: In selecting the components of such explosives, it was necessary to bear in sand that if their solubility in not of the same order there will be a tendency for the ingredients to separate during the evaporation.

"Zellpech" is a pitch obtained by apporating the liance from the sulfive cultulose industry.

3

1) Marshall, v 1 (1917), p 90

2) Naoum, Schienn- und Sprenguroffe (1927), p 16

3) Davis (1943), p 50.

Reachit (Raschite), A class of mixtures invented by F. Ranchig and prepared in the same manner as Ranchig a White Powder. Some Ruschites were used as blasting explosives, others were used during by I as propellants, called Wasseelesliche Schiesspulvern, which means Water soluble Peopellants. Table 51 gives the composition of sevenal Reachites.

Toble 41

	Composition, %										
Designation	Am pitrate	Ne nitrate	Na ben- zent sulto- nate		Zelipech						
Rapchit 1	74 1		26								
Reachit 2	87		13	-							
Reachit 3	86	-	1 - 1	14							
Rnochit 4	69	- 1		31							
Raschit Type 1	- 1	65		35.							
Reachis Type 2		68			32						

Note: Colver (Ref 4, p 352) stated that Rauchit was invented in 1911 by Adolf Veight of Germany. References

1) F.Reschig, Angew Chem 25, 1194-97 (1912)

2) F.Smechig, S.S. 7, 292, (1912)

3) Marahall, w-1-(1917); pp 90 8: 192 4) Colver (1919), pp 332, 707 and 738

5) J.Pepin Leballeur, Poudres, etc., Paris (1935), p 287.

Revehiese Pulver. Smokeless Propellant, also called Reschachwaches Pulver, which means West Snoke Propellant or Semi-smokeless Propeliant. (See Propellants).

Rauchiosos Goschürzpulver 1889 . See RGP 89 (Pulver) ..

Reuthloses Rottweller Pulver. See RRP.

Roupperschlupper (Caterpillar Tractor) was used for towing Respicate-Support (Canterpillar Tractor) was used for toying or 'carrying jairg mun and other items for military, used to the control of the

Bon-Posts . See Rohoulvermann.

(Rottweiler Celluloue Pulver) (Rottweil Cellulous Propellant). The first German gelatinized malitary amokeless propellant which was invented in 1885-1884 by Carl Duttenhaffer (born 1843, died 1903) independently of P.Vieille who invested Poudre B (see in the French Section). The first RCP was prepared at the Rosswell Plane by nursuna partially carbonized wood (the same kind as was used for prepa of brown powder, called Pulver C/82) by a method similar to that bee'd in prepa of Schultze's Powder. The sitmend product was stabilized by boiling water, then dried and existinized by means of ethyl accusts. The gelatialized product was grained either in the form of small

icaflets (Blattchenpulvet) fot use in tifles or in the form of strips (Streifenpulver) for use in cannons, References:

1) H. Brunswig, Das sauchlose Pulver, Berlin (1926), pp 6-7

2) P. Tavernier, Mempoud 32, 244 (1950).

Ger 156

Recoilless Gun (Kanone ohne Rucklauf). Several models were developed in Germany between 1937 and the beginning of WW II. Most of these were of Rheinmetail - Borsig Co design. One of the best known was the LG-1-Rb (later designated as LG-40) which was a 75 mm gun with a range of about 6800 yards. It weighed 325 lb (complete), was 45 inches overall and had a barrel 29.5 inches long, it used the Rheismetall horizontal sliding breechlock which carried the counterblast nozzie, .

The larger caliber recoiless guns included

a) 105 mm, known as LG-2Kp and as LG-40: This had a breech system very similar to that in, the Russian recoilless gun which was developed before the Russo-Finnish War. The German model weighed 850 ib complete b) 105 mm, known as LG-2-Rh, LG-40-1 and LG-40-2, which used the Rheismetall breech design, it weighed 1200 lbs

c) 155 mm, designated in service as LG-42, weighted about 1400 to in firing order and projected a shell weighing about 90 lbs

d) DKM (Dusen-Kanone-Marine), developed by Rheinmetall-Borsig Co, was made id two versions: the DKM-63, cal 88 mm, for use on light patrol craft and the siant DKN-64, cal 280 mm. These two guns were still under dr velopment at the end of the war, but the DK:5-43 was almost ready to be put into production. Both guns were supposed to use, the Rheinmetall horizontally sliding breechlock with counterplast nozzle

el Aircraft recolless weapons, developed by Rheinmetall-Borsig Co, included the Device 104 (a, 14-inch gun firing a 1500 pound AP projectile) and the SG-1 F3A. designed primarily to attack tanks from the air. f) DUKA 50 and DUKA 88. Two recoilless aircraft

weapons produced by Rheinmetail. Dara and description of these guns are contradictory and little is known in a) Rheinmetsill like-115 was a 55 mm waapon of very original construction. It was still under development

at the end of war The above weapons were briefly described by R.March.

Ordnance 38, 887-78 (1954), F.C. Haverlack, in Picationy Armenal Technical Report

1487 (1945), described a complete round of unfired hollow shaped) charge used in 75 mm Revoilless Gun, L.G-6b. W.W.Fahr in CIOS Rept 32-108 (1945), described the recoilless gun development of the Rheimmetall-Borsis Co.

Recuilless Mortor, caliber 2", was briefly described by h. Dorbberger, V-2, Viking, N Y (1954), p 270, its pro-jectile weighed 15 lb and the velocity 1300 ft/sec. The weapon was optically triggered by means of a selection cell. When the plane's selhoueste appeared on the cell. the round was automatically fired,

Recallless Waspens, Besides recalless guns and the re-collies mortar described above, the Germans used numerous tubular Tocket launchers, such as Panzerfaust, Ofentoht, Panzerschreck, Püppchen, Panzerwurfming, etc., which also were, acrectly apeaking, recoilless weapons". .

References: Intelligence - Bulletins, US Var Department Washington, DC, Vol III, No3 (1945), pp 74-79 and Vol I No 7 (1945), pp 9-16.

Reducing Sere Gun, Gurlich Type Gun, Squeeze-Bere Gun. See Tapered-Bore Gun .

Balbanamente (Friction Test). See in the general section

Ruinfereine igniter, See Zandverernicker. Balant (Para Trinimospheres). See under Trinitrotoluci-

Remote Central Systems for Controlling the Missiles. See Guidance Systems for Missiles.

Research and Davelepment Establishments for amaunities nescente one Dayscopment Establishments for ambinities, rockets, rocket faels, guided sits list, autorits and weapons are highly described by L.M.Simon et al in CIOS Report 30-71 (1949).

Resing. The mamoplastic sed thermosetting regins used by the German during WW II are briefly discussed by B.Schopt in BIOS Final Resert 1191 (1946).

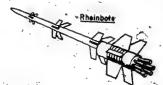
Revalver (Revalver). See under Venponn.

Rentt. See Rhexis. ....

HGP 89 (Ranchioues Geschützpulren 1889) (Smakeless Compon Propellent of 1869), A propelling similar in comsocicies to Italian Ballistite.

Reference: Daniel, Dictionnaire, Paris (1902), p 682.

Sheinbere (Rhein Messenger). As unguided, three-stope beceret, metrice-to-nurises missile, developed in 1943 by the Rheinmetall-Borotz Co under the direction of Klein and Villers. It commissed 45 to 64 - 185, used 1287 b said Villara. It commissed 45 in of a tile, used 1287 in at a said distriptionselyted districture propellars, was provincial visit a saw-flasted beneater, and could be leunched from the saw-flasted beneater, and could be leunched from 17781.5 15 and of creater was a saw-flast and of creater was a saw-flast and 2 of stope were 0.38 it and of the 3 at sup 0.5 it. The lengths of the 13st sup 0.5 it. The 13st sup 0.5 it.



1) K.W.Getlans, Development of the Guided Misuile, "Flight" Publication, London, (1952), pp 95 & 122 3 2) b.Domberger, V-2, Viking, N Y (1954), p 248-

Rheinisch Dynamit. A dynamics patented in 1874 consisted of NG (comts 7-3% of dissolved hydrocarbons such as napthalene) 75, washed and dried kieseiguhr 25 and chalk

Reference: Daniel, Dictionneire, Paris (1902), p 687.

Rhetemetall Ammunition. The Rheinmetall-Borels Co was one of the principal manufacturers of assumption. Some items manufd before WW II were extended at Picacian ...lappanA

Reference: G.Talisterro, Pic Aran Tech Rept 962 (1939).

Rhatesenter (Daughter of the Rhein). A type of mided missile used against England during VV II. Several madels were known, such as R-1, R-2 and R-3.

References (See also under Guided Missiles) :

1) Anon. Army Ordnasce, 31, 28 (1946)

2) A.Ducrocq, Les Armes Secrètes Allesmodes; Paris (1947), pp 89-90 and 96-98

1) Asso, TM 9-1983-2 (1953), pp 226-9-

Rhantt oder Renit (Rhenite), According to Colver (Ref 1) Realt was one of the garlier permissible explosives . concessed; Am sittrace 64 to, 68, NG 6.5 to 8.5, TNT 6.5 to 8.5. Nn signet 13 to 16, wood meal 3 to 5 and majagers \* 0.5 to 1:5%. --

According to Naoum (Ref 2), Rhezit was our of the pre-WW II streight dynamices, sucif as: NG 64.0, wood men! 7.0, partly decomposed wood 11.0 and his chloride 18.0%. Its properties were: density 1.34. Transl test value 185 cc, oxygen balance-11%, and Pb block crushing value 20 mm.

References

1) Coiver, High Expissives, London (1918), p 249 2) Naoum, Microglycerin, Baltimore (1978), pp 283-284.

Rhinacoros, See Nanhors, under Panner. Rieseimine. See under Landmanes

Riffe (Gewehr) . See under Vesposs-

Riffed Prejectile (Pre-tifled Projectile), Three such projeculies were described in TM 9-1983-3 (1933), pp 326-328, All of then had a rifled design which took the form of 12 longitudinal splines inclined about 5° and spaced about 50 mm spart. The splines were not machined from the main projectile body but constructed asperately on strips of steel which were then fitted into grooves cut is the projectile body. The grooves were undergut to provide necure senschment.

It is assumed that the splines were intended to engage in the rifling of the guni.

To the test of the projectile there was a copper or bimetallic driving band, the probable function of which was to act as a gas sen).

Two of these projectiles were used in the Railcoad Cannon 28 cm K 5 (E), while the unwoof the third projectile is unknown.

One of the projectiles [28 cm (280 mm)] was micketassisted. It weighed about 546 lb (fonded and fuzed, but without sucker ignition fuze). The weight of HE charge was about 31 lb and the wt of propellant 43 lb . The maximum range of the jun was about 53 miles.

Another type of 280 mm projectile weighed 362 lbs (loaded and fuged) and was filled with about 67 lbs of TNT/wax - 95/5, pressed in blocks in a cardboard conteiner (See drawings under Granaus and under Rocker

(See also Pre-cognited and Pre cifled Projectiles in the gen-

Rifle Grandes (Gewehrgranten); Rifle Antitonk Granades (beweltspenzeggmenten). The following types are buefly described in Refs 5, 2 & 3:

m: Small Ancienak Rifle Grenade (Gewehrpanzergranate) was fired from the rifled 30 mm discharger cup (Schieas-becher), which could be litted to most types of German rifles. The greende was constructed in two parts, the head and the stem (body) which was screwed to the head. The head was a scemicus steel tube, the forward portion of which contained a steel cone and the bursting charge consisting of 1,75 oz of TNT poured around the cone. Directly behind the TNT was located the PETN/wax exploder (suxiliary booster). The stem was made of a light alloy of aluminum and was provided with a pre-cagnived driving hand. The upper section contained the eagmwed-driving name. he upper section contained in gasse. (deconator-bookser assembly, and the lower section the printer sacembly. Total weight of the grennde was 8.8 oz., the overall length 6.4°, the maximum deameter 1 316° and the range 50 yds (Ref 1, p. 8 and 1. Ref 2, pp 334-5)

Rel 2, pp 334-5)

l Antisage Manner Rifle Grenndr, designated as
C Page 42, described in Ref 3a was similar in ap-pearance? to the one described immediately above.
The C Page 42 continued 49 g of 50/59 Cytolol as the bursting charge. Its beoster and auxiliary booster consisted of 91.4/8.6-PETN/Fax and weighed 12.7 g. Consisted of 71.475. We provided not weighted 1.1.1 g. The fute assembly consisted of an upper primer charge of 0.018 g of & chlorate 02, 5b suifide 30 and abrasive 8%, and a lower primer charge of 0.01 g of carbon lts detonator contained 0.33 g of 76/36 Lead anish Lead styphnate (upper charge) and 0.49 g of PETN (lower charge) (See general Section under Carbon)

The grande was propelled by a 1.0 g charge containing 96.5% NC (13% Nt. 0.6% diphenylamine and 0.1% amphite, the rest being organic impurities in NC, total volatiles, and water soluble substances. The primer charge consisted of, 0.028 g of a mixture of Be primer 16. Ph styphnate 35. Ca silicide 15 and Sh sulfide 4%. Total weight of the grenade was 0.325 ib and the premil length 6.36 (Ref 3a)

d Large Astitack Rifle Gregade (Grosse Gewernanzers smoate) | was fired from the same 30 mm discharger cup (Schiessbecher) as the small grenade described under (a). The head of this greends was inrger (max dien 1%). The length of the ensemble (head and stem) was 7°, the total weight 13% on and the ,wr of the

was ', the total weight 15% of and the wr of the diller (TMT) 45,000, he campe was 100 yd. The time and booster were similar to the greende (a) (Ref. i, p. 8 and Ref. in p. 157).

Of a streamlined bell-shaped body, with a slightly cover closing diec of aluminum, a graze fure which screwed into the base of the body, and a waned and and which accewed on the base of the fure and, was uset which acrewed on the basic of the fance and, was closed by a rubber play. The burstung charge consisted of cast Cyclonic/Was with a hemispherical, cavity in the head. The cavity was fitted with an aluminon the property of the propert and drove the pin forward causing it to cut the shearing pin away from its acrewed end. The pin was then ejected (by the spring held in compression under its head) and thus lets the striker which had been held away from the denounce only by the creep spring. On praing impact the treep spring and the detonator was pierced. The grande assembly was 9.3" long, the head 3.1" and its maximum diameter 2.4" (Ref. 1, p. 9 and Ref. 2. PP 337-83

A more detailed description, of the grounde in given in Ref 3c. The composition of the propellant was: NC (13% N) 96.5, diphenyla.nue 0.6, graphite 0.1. total volatiles 0.9 & organic impurities 1.7%, and of the percussicoprimer water soluble 0.2.86 natrate, 46,Ph styph name 35. Ca selicade 15 and Sh aulfide 4%. The weight of propellant 1.0g and of primer charge 0.026g. The burnting charge (34.1 g), consisting of PETN 88 and was 12%, was initiated either by the driction igniter or by the dethuness. The ighiter contained as the upp charge

0.020 g of red lend 74.7, silacon 17.8 and binder & fuel 7.5%; as the intermediate change 0.120 g of NC; and as the lower change 0.010 g of K perchinance 55 and as the lower enhage 0.010 g of K Perchlames 3, and Ph ferrographic 45°s. The Glay element contained 0.000 g of black powder and the flush element constant 0.100 g of 0.00°s. The deconance constant as the upper 0.100 g of 0.00°s. The contained of 0.00°s of 0.00°s

e) 37 cm Antimak Rifle Grenade, fired from a 3.7 cm Pak, consisted of a min-walled steel head of bulbous chape to which was attached a closed steel paper surrounded by a multi-perforated sheet steel sube to which six vanes were welded. The head was loaded with 5.2 lb of either Dinigraniling/INT mixture or with pressed Cyclorol consisting of RDX 62,3, was 2.4 and TNT 35.3%, its hose fure assembly (AZ 5075) 2/4 and INI 35,375, its hose bare aspectory (AZ 3977) constated of a primer detanant (with 0.31 g of leads azide as the upper charge and 0.30 g of PETR a lower charge) and a detanative bare twin 0.30 g of 0 f 69/31. Lead saide/Lead styphanate as the upper charge, 0.30 g of PETN as the lower change and 6.8 g of 50/10 - PETN/Wax as the booter, its base has of 50/10 - PETN/Wax as the assembly (BdZ 5130) consisted of a primer (containing 0-150 g or 41/30/20/9 - K chlorace/5b sulfide/Newsusy 0:300 g or 41/97/20/9 - K. Chlorase/30 sullide/Memmuy climinass/Glass and a binder matter, 0 0,050 g of black powder consisting of 37/15/12 - K siwate/charcasi/sullius/ and a deconstor-honosier (cons.got,050 g 59/3) - Lead azide/Lead syphanes, 0.00 g/sof PETN and 6.8 g of 90/10 - PETN/Faxts. The propoliting charge consisting of 217 g of NC/NG or NC/DEGDN mbulser profellant was codmined in a speel carmidge case. This charge was ignited by 4 g of NC granular propellant and a percussion ype primer consisting of 41.7/25.5/20.5/12.3 - K chlorate/Nercury fulminate/ 41.7/22);//30.5/14.5 - a culoracy mercury numbers:
5 sufficie/Abrasive and 0.5 god black powder (75.9/
14.7/9.2 - Knitests/Charcost/Suffici. The impact fune functioned in the case of direct impact, where she hase fuke functioned in the event of grass action. the base tune-tunctioners in me event of graze action.
Total weight of the grenade was 18,7 lb, over-all
length 12 1/8° and length of body 12 1/4′ (Ref 2, pp 335-6).
A more detailed description of the grounds is given
in Ref 3b

). Antipersonnel. Rifle and Hand Grenade (Gewehr-

springarmane, fried from a Mentiner Biffer over his propagation of the configuration body (5,5° long and 1.2° man dismesses) which propagate a barraing and 1.2° man dismesses) which propagate a barraing and 1.2° man dismesses) which propagate a barraing and propagate and a friction inplies (similar to 52° 43) intributed a character of the propagate and a friend inplies (similar propagate and a friend propagate and a friend propagate and propagate and a propa sprenggranam), fired from a Mauser Rifle Grenade Disof the mastle was 9 oz and maximum range 550 yd, (Ref. 2. pp 332-41

a) 46 mm Antimok Rifle Grenade (SS Gewehrpansergramate) consisted of a base-fused this walled steel sulbous shaped attenuitied shead (46 mm to diameter and 93 mm long), to which was attached a prerilled and yo man longs, to which was attached a prerilled cylindrical aceas 30 mm in dismeter, and 102 mm long, in hursting hollow charge consisted of 143 g of 50/50 m EDX/TNT which was astitated by the following devices: a fuze planner. [cong 01068 g of K chlorace 450,8 b suffice 430,8 and Hg Indimance 7.2%), a deconator (contg 0.33 g of 77/23 - Pb unide/Pb styphnate as the (contg 0.33 g of 17/23 "Po waide/Pb styphnate as the upper layer and 0.46 g of PETN as the lower layer), and a booster (contg 6.4 g of 94.5/4.5 "PETN/Wax mixture), it was propelled by 1.44 g of single-base propellant (contg 97.3 % on NC with a N content 13.2%) which was primed by 0.027 g of a mixture cost g ha The total weight of the granude was 13% on and overall length 195 mm (Ref 1, p 9; Ref 2, p 331 and Ref 3e).
h) 61 mm Aftutank Rille Granade (SS Gewehrpannergranate). This grenade was similar in construction, except for some dimensions, to the previous grenade.

GRENADES LEAFLET SE STEEL PACKING DARGTII CHARGE FILLES STAR PATOS THER RE-

The soral weight was 19 oz, overail length 238 mm, length of stem 102 mm and its diameter 30 mm, length of head 136 mm and its max diameter of mm. Its bursting and propellent charges, as well as an primers, demande

and plopellest charges, it went as an instance, neutrators of the plot of the previous greende. Its overall length was 244 mm, black of the plot of th was fired from the rifled 30 nm discharger cup (Schiess-bechet) which could be fitted to most types of German rifles. It consumed of a cylindrical steel body (with a pertiled base) containing a delay fuze, a thin cylindrical container for the passibilities and an electing charge for this cylinder. On frang the greande, the propellent gases ignited the delay fuze and, after about 9 seconds of delay, the fuze fixed the ejecting charge. The resulting dellagration blew off the cap and forced the leaflets out the nose, Total weight of preside 8 oz, overall length 5.7" and range 500 vd (Ref 2, p 338)

k) Illuminating Parachute Rifle Grenade (Geweh b) Illusinating Parachute Rife irenade (Geweh Pallachunio-Originane) consisted of a tinewalled Pallachunio-Originane) consisted of a tinewalled which housed the parachute and illuminating star. The rear of gerande contained two delay pellets and two spection charges. When fired the flash from the original period of the properties of the passe forced out the south of the container (which beld they parachute) and the start. At the sourt time, and time the properties of the p beld the parachute) and the start. At the same time, delay (2) was ignited and after it burned through (2 seconds) the ejection charge (2) became initiated. The resulting gases ejected the paracaute and the star toom the container and ignited the star, it was channed that distances up to 650 meters could be illuminated by this ame. (Ref 2, p 339) (See also Faustpatrone and Pigtol Grenades).

References:

1) A.J.Dere, The Ordnesce Sergeaut, October 1945, pp 8-10; 19 A.J.Dire, The Urbalact Segment, to 22 Jacos, Th Wy1957-2 (1973), pp 311-39 -37 Picatinay Areand Technical Reports: a) A.B.Schilling, No 1342 (1944) b) A.B.Schilling, No 1396 (1944) c) A.B.Schilling, No 1494 (1944) d) F.G.Haverlak, No 1507 (1945) e) F.G.Haverlak, No 1507 (1945)

Atfie (Geweis). See under Venpone.

Biffing of Womens, See general section.

RLGS (Raketsaleuchtgerit Scheingrachosa). Rocket Illuminant Simulating Device. See under Pyrotechnic Antipathfinder Devices and also in CIOS Rept 32-36 (1945),

#-bline 42. See under Landminen and also in TM 9-1985-2 (1953), p 272.

Roberts (Roberte). A type of permissible explosive patented by Rode about 1886. The earliest type counisted of Am nitrate 90 and dinitrochlorobenzene 10% It was claimed by the inventor that a nitrated chloro-compound gave a higher velocity of detonation and greater power than the correspondent nitro-hydrocarbon. The above Roburite was sensitive to friction; when ignited with a flame or a spark it burned without exploding.

Table 52 gives the composition and some properties of several Robustes (See sent column).

1) J.Daniel, Dictionnaire des Matières Explosives, , Paris (1902), p-687

2) Marshall, v. 1 (1917), p 391 3) Colver (1918), p 141.

Table 52

, Ro	burites		
Components and Some	D	r Bignati	aa.
Properties	1	11	ш
Am natrare	87,5	71.5	55.0
K nitrace	-	5.0	9.5
K permanganate	0.5	0.5	0.5
Am sulfate	5.0		-
m - DNB -	7.0	- 1	-
TNT	-	12.0	12.0
Flour 4	-	6.0	6.0
Na chloride	-	5.0,	7.0
Am chloride	1	-	5.0
Magnestte		-	5.0
Trauxi Test, cc		325	257

Röchling Anticoncrete Projectile (Röchlingsgranate 42 Betos, abbreviated as RöGr 42 Be). According to German photographs available at the Picationy Arsenal and Aberdeen Proving Ground Museums, it was a subcaliber shell which casefuled in appearance the "arrow projectile", except that instead of the fin susembly of the arrow shell it. had a discarding flange serving as a driving hand. The front flange acted as bourtelet. These projection were fired from regular guns, such as caliber 21 cm and 34 cm. The 21 cm shell weighed 193 kg and was 2.1 m long The corresponding characteristics for the 34 cm shell were: 913 kg and 3.7 m.



# RÖCHLING PROJECTILES

The shills were designed and manufactured by the firm of Röchling at Saatbelicken, Saar.

ism of Rocasing as consumments.

References:

1) K.F.Kempt, Museum of Aberdaen Proving Ground, Md;
private communication

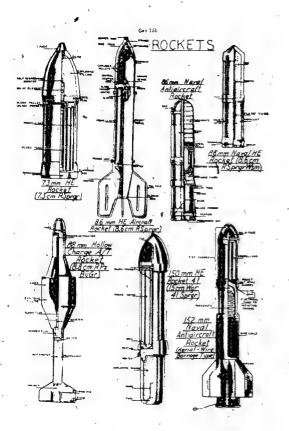
7) H.H. Bullock and G.Coghian, Picatinny Arsenal Museum;

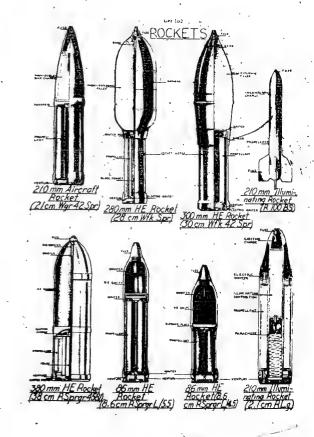
private communication. MSee also Arrow Proje-tiles and Gesenes Projectiles).

Rocket (Rakete). Lerman rockets of VV II were propelled either by solid propellants fruch as colloided snokeless double-base NC-NG propellants) of by liquid propellants. The liquid propellants consisted of combustibles (such as alcohol, benzene, antline, saspline etc) and owegen carriers, such as liquid oxygen, hydrogen newwede; aurogen peroxide, ditric acid, etc. (See under Rocket Propellants). The-following tockets were briefly described in Ref 3.

(Some information on these tockets may be found in Refs 1 and 2h

a) Butterfly (Schmestering) Rocket [1811] (Hs 294) (Ref 3, p 196) (See under (qualed Minniles)





b) Daughter of the Rhane (Rheintschier) Rocket (Ref 3. a 226)

e) Fire Lily (Fenericlies Rockets 1-25 and 8-55 (Raf 3, p 224) d) Great Engine Rocket (Ref 1, p 229)

e) Henschel Rockets Ha293 and Ha296 (Ref ). p 200) f) Long Range Rockett A-9 and A-10 (Ref 3. p 235) g) Radio-Controlled Glider Banh PC 1400 FX (Ref 3, p 195)

b) Rockets V-1 and V-2 (Ref 3. s 203) i) Rocket X-4 (Ref 3, p 214) j) Taifun Rocker (biliquid) (Ref 5, p 275

k) Sacerfall Wasserf all: Rocket C-7 (Ruf 3, p 319) i) 73 am Propagada Rocket (73 cm Propagadagesante) (Ref 3. p 234) and 73 mm HE Rocker Shell (7.3 cm Rakeemsprenggennate) (Ref 3, p 235)

at) 80 mm HE Rocker Shell (8 cm Rukeconsporagemante (Ref 5. p 237) a) \$6 am HE Rocker Shell (\$.6 cm Ruberens prengaments)

(Ruf 3, p 2393, 86 mm R Sogs L/4.5 Rocket (Ruf 3, p 256), 86 mm Eleminating Michet (Naval) (Ruf 3, p 240) and \$6 mm Asciasceraft Rocket (Naval) (Ref 3, p 241) a) #8 mm HeC. A/T Rocky: (shaped charge entities) (fol ), p 2(2)

p) 130 mm HE Rocket (upin-centalized) (Ref 3, p 245) and 150 mm Samke and Chemical Rocker (spin-ambilized) (Bet 5, F245)

s) 152 mm Assisteemis Rocker (fin-embilized) (Ref 5. a) 200 um Antiniremit Rocker (Speciabilized) (Ref 3.

p 3440 t)'210 mm HE Ainreale Rocket (apin-atmittland) (Ref 3, p 248) and 218 mm Illuminating Rocket R-La (Ref 5;

u) 280 mm HE Rochet (spin-umbritand) (Ref 5, p 250) v) 300 mm HE Rockes (spin-sentilized) (Ref 3, p 251) w) \$20 me incuminty Rocket (spin-scabilized) (Ref 3.

n) 580 mm HE Rocket (spin-ambilined) (Ref 3, p 254) vi & 100 ES Air-to-ftie Backet (Ref 3, p 255)

Abbreviationas HE High explosive; HoC Hallow charge (See also Guided Minailes).

References 11 A.Docrore, Les Ames Secrétes Allemandes, Berger Lavault, Paris (1947), pp 140-149

2) A.Sertbucher, Spreng- und Schiennmife, Rancher, Zürich (1948), pp 50-57 3) Dept of the Army Tech Manual TM 9-1985-2, (1955) pp 195-

4) J.G. Tachinkel, Chem Eag News 32, 2582-2587 (1954) The following Picaciony Arsenal Technical Reports were desired to Corner sections.

5) A.B.Schilling, Pic Aren Tech Rept 1427 (1944), 90 am Baspeks syse rockes 6) A.B.Schilling, ibod 1568 (1945), Warhand and Puzze

of A-4 Rockes (Called sine V-2 Rockey) 7) V.L.mdner, ibed 1817 (1951). Evaluation of Some Rocker

Propeliants Used to UV II (Contidential). Now: None of the confidential reports were used as sources

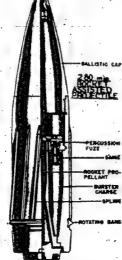
of information for this work, The following ClOS Reports contain some information

The distriction of the control of th

102 R.C.Staff, CIOS 30-113 (1945), Rechet Pewer Flance Designed and Constructed by Walter Works, Kiel 11) F.J. Ewing & M.M. Mills, Class 31-13 (1945), Rampet and limits t within Hearts.
12) h., Eppa. ClOS 12-36 (1943), Pyrotechnic Antipath-inder Devices (includes description of pyrotechnic markets:

15 cm RSSG, 15 cm RLGS and 15 cm Smoke Rocket) 13) A.B. Meinel, CIOS 32-114 (1945), 21 cm RLG kecket (Flare).

Rocker-Assisted Shell- a projectily which commised a rocket propellant in a special device attached to the have of the shell was developed and used during by II. The shell was fired in a regular manner from an B inch gum, but during the flight the rocker composition became ignited and the shell started to function as a rocker. This method of propulsion increased the range of the shall from 38 to 60 miles without appreciable increase of dispussion. Reference: PB Rept 925 (1945), p 19.



The Policesia, rocker-nesissed projection to briefly described in TM 9-1983-3 (1939), pp 509-10 and 527-8; a) 150 nm Projectic (13 cm RGs 19) weighed 99.5 lb and was find from the Newry Field Howstone 18 (15 cm)

aFH 18). Its castidge case (semi-fixed) contained 13.64 lb of tubular, disthyleneglycol distingte type propelinat b) 280 mm Projectile (28 cm R.Gr 4331) weighed (with b) 480 mm Projectile (28 cm R.Gr 4331) weighed (with

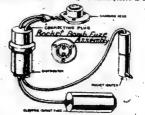
our worker ignation fuze) 546% Ib and was fixed from the Railway Gan [28 cm K 5(E)]. Its propellent charge was 43 lb of double-base propellant, and the beauting charge was 30% ho of concilentage properliant, and the beauting charge was 30% ho of unknown HE. The shell was provided with a cocker spation fune (ZiZ 5/30) which insuctioned stem 19 seconds to spatic the recket propelliant and with two luxes (AZ 4331) and two PETM boosters (ZZABZ C/SNR) which satisfared the

bettering charge on impact
c) la CAOS Rept 30-115 (1945), pp 26-27 and enclosure
20 are brielly described the Rocket Assisted TakeOff Units, designated as RI 203 and RI 209.

The following necleasified Picationy Amenal Technical Reports describe some rocker-assisted shells which wore examined during WV II.

1) A.B.Schilling, 1604 (1946), 105 nm Rocket-Assisted, HE 2) A.B.Schilling, 1605 (1946), 105 mm Rocker-Assisted, HE 3) A.B.Schilling, 1606 (1946), 128mm Rocket-Assisted, HE 4) A.B.Schilling, 1607 (1946), 150 mm Rocket-Assisted, HE 5) A.B.Schilling, 1608 (1946), 150 mm flocket Assisted, HE 6) A.B.Schilling, 1609 (1946), 150 me Rocker-Assisted, HE

7) A.B.Schilling, 1610 (1946), 150 mm Rocket-Assisted, AP Rochet Somb Fuse Assembly, described on pp 169-71 of TM 9-198-2 (1975) operated as follows: On release fitnes the airmant the electric charge passed from the charging bend to the distributor and three directly to the bends face. Thee, after a delay the current passed on the



secket propellast' jamer. Dering the flight, the nocket was ignized and when the boarb hit the enget the impact lastinged die fuze, After a short delay (for penetration purposes) the burning charge was detomated.

Rocket Bullet, According to CIOS Rept 35-20 (1946), pp 6, 6A & 7, a 9 min socket minsile was under development during VV II by the Deutsche Volfere und Municionafalriken A-G, Lübeck, A denveng in emclosed in CLOS Rept 33-20

Rocket Louncher or Protector (Raketenwarfmarchine piles Varigation According to the Intelligence Bulletin, Was De-partment, Washington, D.C., vol. 5, No. 7, March 1945, pp. 1-9, the litest Gurman rocket Innachers were Schworns Verigorite 40 (heavy throwing apparatus 40) and lebweren Feriporer 41. Each of them could fire either 280 mm or 320 mm rockets weighing 140 and 196 ib respectively. The

The SRG 40 launcher consisted of a wooden frame (Warfgreitell 40) on which were placed wooden shipping castes containing rocken. The frame was inclined at

the desired angle and the rockets were fired directly from The SWG 41 laun her consisted of a frame of steel tubing (Burigestell 41) on which could be placed exther

The so-called Schwaras Warfrahman 45 (bear) throwing rack 40) consisted of a s sociated plates mounted on aides of an armored hal, muck (three on each side). The tocket carrying crates were secured to the places, and the larger then inclined at the required angle of furing, One of the most imp-titues rocket protectors was the 15 cm Habelwerfer 41 (literally "amone thrower"), nicknamed by the US soldiers "Squeening Meenie", nicknamed by the US soldiers "Squeening Meenie", it consisted of six grouved tubes, 5.9", in dispeter, mounted on a light two-wheeled carriage with 4 split trail. The crew of two men loaded the weapon, took shelter in a slit trench and then discharged the rockets (a six-mond salvo each 8 minutes) by semote control. The maximum range of these rockets was 8,000 rd.

Similar to the 15 cm Nebelwerfer 41 was the five-sube 21 cm Nabelwerfer 42 which fixed 8 inch fockets as (as 84 8,600 yd.

Note: None of the Nebelweriers, were accurate and for this reason they were not very suitable for launching HE rockets. Hesides using these launchers for rockets to lay down smoke concernations, they were also surable as projectors for gas-loaded (chemical) rockets. In both cases so accuracy of fire was required.

50 accuracy of lim was recounted.

In order to give their larger tocket projections greater and in the project of lines and our creame the accuratly of formation are considered to the surgical and the surgical

Dissanisfied with the slow rate of fire of the above launchers, the Germans in 1942 introduct a quicker firing weapon called the 15 cm Pennerwerler 12 (150 mm antiweapon called the 18 on Fonzewerier IZ (150 nm markant thower 42). It consisted of two smale of 15 cm. Nebelweder 41 isunching tubes (with ai), tubes in each basal mousted on an amorthed half-track. Since the crew the deep size of the size of the

following socket launchers used during we III.

a) A two-mmed cradle type launcher (or the Hs 117
(Hs 297) Schmetterling rocket-propelled missile (p 201)
b) A rail type launcher; (0 cm long (huge on the carrier
aixtraft) for the Hs 208 manufac (p 205) c) As inclined many type inuncher used for the Feuer-lilie F-53 focker-propelled guided missile (p 225) d) A launcher for the Grent Engran morker a maisted of two tron sails 6.8 m long mounted on a chanded

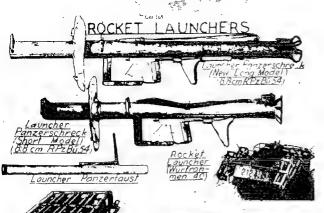
88 mm gun carriage (p 229) on mm gan currange to 229 e. A. ningle-rabe type launcher (Propognativerfus) for 7.3 cm Rakezengranne 41(p 234) f) A 35-frame launcher (Führsperit) for 7.3 cm Rakezengranner (p 235)

g) A multiple-rase ground launcher (Rokeren Vier act worker) for 8 cm Raketen sprenggrannte (p 237)

h) A single-barreled launcher, designated as 8.6 cm R Ag M 42, for the 86 mm flare rocket (R Lg 1000, or wire rocket (RDg 1000) (p 240)

1) A single nibe, two-wheel launcher (8.8 cm Raketyn-worder 43) for the 88 cm hollow charge rocket, designand as 8.8 cm R PzBGr 4322 (Raketon Panzerbuchse Granaty)

i) A usuglu-barreled inuncher designated of 21 on R Ap Maz, with a Berrel 1,12 m in length, used for the 210 mm rocket designalsed 21 cm RLg (p 259)



Rocket Layncher (26/3/2m Wurtgerat 41)





Louncher 15 cm Conzerwerfor 42





Launcher 'Do Werfer or Wurtgerät

k) A four frame launching stand (Wurlgerät) for the 780 nm HE rocket (28 cm Wik Spr) (p 251).
See also under Wespons).

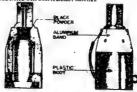
Rocket Projectile, See Rocket-Assisted Shell

Note: Rocket-aussisted projectiles were fired either from southers or going. For instance the 15 cm RGc 19 was fixed from the 15 cm well 13 themy tired howetizer to and the 28 cm RGc 453 was fired from one 25 cm A (§) endeading on 5). Sec FM 5-193-3, 193-5, pp. 949-8, 273

Recket Propellent, According to Listeniaks, Przenyst Chemeracy D' (4), p 40 (1948), towastast by Dr. Listeniak uncertainty and state propellents containing mirror listenia and stronglycern is these smaller modes, and the state of the state

was sufficiently freat, Water (vapor) and daygen served as driving forces.

Rechet Projection Lightime ERZ 29, burefly diversibled on ph. 623 of TM 91-095-51(915), littled into one of the vertical of the 15 cm and 21 cm rocketa, its body, made of a plastic with an alemanum hand sound the thouster, contained an ignited bridge from which man two wires. One wire was a part of the contract of the contract of the sound of the sound of the sound of the sound of the other to a need disk in the sound to provide the short of the other to a need for the sound of the





Rocket Properliest Inhibiting Conting. In order to prepare a settle of properties, see that it anough some from an end and not on the baden, the "Jaim was made that it was sufficient to cover the after of ents to take, by dipping is 'three into a special compositione developed at the Duneleys Fathel' of the Dynamit A-C. The 'composition consisted off nody visiplaceasts, 31' thropone t/mS > BaNO<sub>A</sub> 10, methylaceptate 5 and matter 40°.

Reference A.A.Swanson and D.D.Sager, CIOS Rept 29. 4 (1940), p 5 (As reported by Dr. B.Leunig).

Rocket Presidents, Liquid The following liquid rother propellants were used by the termans during We li-

a) Conten mated hydrogen peroxide and C-Stoff was used in the da 140B hatter Rocket (surface to air)

Note. Costoff & a 50/50 mixture of methanol and hydrazine hydrazine, N. H., H. O.

- b) Concen rated nitric acid and Vixol-to was used to the frazian E-4 Rocket, Rheintochter R-3 Rocket and hwssettall I ocket
- Note: Visor 6 is viny lether ether
- c) Concents ted nitric acid and Tonka were used in the Robinstahl 4-4 Rockes

Note: Tonka is a mixture of antiline, monocitylantine, dimethylantine, g softne, naphtha, methylamine and iso-hexylamine.

- d) Concentrate, hydrogen peroxide with K-permanganate was used in the Hecht Rocker
  e) Liquid oxygen alcohol and water were used in the
- y-2 Rocket and smerbite-55 Rocket
  Noce: The noncombustible substance, water, was incorpo-

Note: the noncomb titude substance, water, was incorpotated in outer to see the filam emperature as low as spesiole so as to reduc, the mechanics, strain on the motor without sacricipy is, o much performance, it was sound that the addition of 25% of water to absolute alcohol lowered the chamber emperature 7%, while the exhaudt velocity was sowered on 9.3.5%.

- f) Concentrated nate: acid, sylidine and triedylamine were used in the Schim-trerling Hall? Rocket

  g) Concentrated nate; acid and butyl other were used
- in the Inifun Rocker
- h) Compressed oxyget and gasoline were used in the V-1 Rocket

Note: In addition to these the following substances were used in liquid furth: squee, tethylideneaniline, ethylideneaniline, escetaldelyd napths, gasoline, dimenyimalities, escetaldelyd napths, gasoline, dimenyimalities, monomethylamiline, triethylamine, isoberylamine cec. in some of these liquid, sa, such as aniline, Visiold etc. pyrocatechol(Birenikatechia in German) was dissolved. References:

 ii.Gartmann, Weltrauminhrt 6, 134-9 (1951), Jaro and Auxiliary Rocket Propellant Playts
 K.w.-Gatland, Development of the Guided Missile, Phil-

31 J.G.Tschinkel, Chem Eng mews 12, 2582-87 (1954).

Propellants for Rockets and Space, Ships.

Rocket Propellants, Selid. All known perman propellants

Rocker Propolients, Selid. All known perman propellents of WE II were based on NC and a nitric ester, such as NG, DEGDN, or TEGDN.

Table 53 lista-nosit of the rocky; propellants examined at Picatinny Araginal during Wh. II

(See pers page).

Donin and Donovan (Ref 3) giv the burning taxes (in taches per accord) at various per journs for the solid propellant used in the 210 mm Rockes (See Table 34 on next page). The composition of the viopellant is given an Table 30.

The same investigators give the raise of burning for the jet-Assisted-Take-Off-Unit Propellar I listed in Table

(See Inble 55 oe next page).

Ger 167

Teble 53 Pennellasts, Solid

			-	Composition,	*					
Feem	NC	75N in NC	NG	DEGŮN	Cast	Acar	Gen- phite	Other logs	diento ,	Uses
SP	62.5	12.0	33.0	-	` .	0.2		EcPhUres DPhUres Uanc		130 mm HE Rocket
SP	58.7	12.7		35.3	. • .	6.2	0.3	EtPhUrer DPhUrer Ueas		210 mm Rocket
	ecți	12.7	12,3		0.8	2.4			10,74	210 am Rocket (Ignier Ped)
	89.2	12.7		5.3	0.9			UPhA Unac	2.6	210 mm Rocket (Head Igniter Displeages)
Cyl.	59.6	12.5	-	33.6	٠٠.		(secor)	DPkUres DPkUres Usac	4 1.5 3.0 2.1%	75 om Lonflet Rocket
-	64.7	15-0		293		0.3	9.1	ErPhliner DPhiliner (TiQ+BaSO)	3.5 1.3 0.9%	Jes Assisted Take Oil Vais

Abbevintions: Acer Acardins; Cont Custralius; Cyl Cylinder; DEGON Deshylese plycoldinismes; DPha Diphesylessus; price by the proposed of the p

Notes: a) The remposition of the German 130 mm rectag propellant containing NG does not represent asyming new accept the combination of several scholaring a parts. The some resolutation was added in rocket propellant containing

DECON

by While the characteristics of the German rocker perpellaness containing DECON are of increase, repellaness containing DECON are of increased.
The 719 na nocker propellates upon made from NC with a
\*signosisy of 5.38 points as 25 which was placetisted
with DECON and miled since a sheet. This is tern was
relied and a significant containing the significant relief and the significant rel

contraine or acardise (neyes diphenylmes) were used as scabilisers because it was collared that manuses are more affective than single subhiners such as DPhA. To this may be added that, according to Mr. onegati [5 2 32, 302 (1937)], the disubstructs urverbase are very good smbliners for double-base propollature, specially when used in combination such acardite, while embout the latter they are much less effective.

Note: Some rocket propellants and igniters unalyzed at Picnitary Arsenal are listed under Propellants (See Tables 43, 44, 455 and 48).

Surong Maies of 210 mm Rocket Propellant (lackes per second)

		,, , ,,			
Temp °C			esame is	D61	
	360	1500.	2500	3500	1300
- 25 + 50	0.21	0.30 0.43	0.42	0.55 0.73	0.93

gatare#	Rates of	the Jer-A	Lanamed Ti	nke-Off-Ue	uit Propali	inet:
9.0			Pressure	in pai		
Temp °C	800	1000	1500	2,000	3000	3500
- 25 + 50 =	0.15 0.22	0.18 0.27	0.25 0.39	0.33	0.43 0.59	

According to Ref 4, the Reinadorf Fabrik W A S A -G manufactured during WW II several types of rocket perpellants. Their compositions are given in Table 36
Table 36
Ranker Presellants, Salid of W.A.S. A.-G.

Corponents and	Ł i	Des	محمسها		
nows bashessing	RGI.	Róm	2135	2193	216
Nitrocellulese (MC)		57.70			34.5
A Histogen in MC	12.9	12.5	12.7	12.5	12.5
Diethylonoglycol diniume . (DEGDN) .	35.30	38.00	30.00	- :	16.
Triethyleneglycul disturace (TEGDN)		-		22.00	-
Peurserythricul semanistrate (PETN)			29.00	6.00	6.1
Ethylphenylmechane	1.10	''	-		-
Daphenyi strehme	0.90				-
Di bury lpitched aco		3.00			
Acardine 3 . COOHH_MCC_H_1_	0.30	0.50	0,25	. 0.50	8.
Graphite ,		9.30	0.10		
Magazanum umde	0.15	0.501	0.05	-	
fG Farben Wax E.	0.31	٠.	-		
Possasiem sitrere	0.60			- 3	
Ligain	1 -		٠.	-	T 0.
Hydroceil nio se	1.50	١.		0.75	, ,
Transfero(wene (TNT)			- '	3.00	
Distrotel was (DNT)	-	-	-	4.50	
Mosster (not included in recei)	1.00	0.65	1,00	1,00	0.
Oxygen Balmace, %	-7.13	- 7.93			
Calorine Value koni/kg	905	867	1071	868	83

1) A.J.Phillips, Pic Aren Tech Rept 2282 (1943); Ibid 1456.(1949)

2) Collective Dem on Foreign Ammunition, PB Rept 11,544 (1945)

3) M. N. Donin & J. J. Donovan, Captured Enemy Propellanm. OSRD of NDRC, Div 3, Sect H. Final Rept, Series P. No 10.2 '1965) (Unclandified) (DSRD 5855)

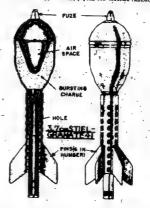
4) F.J.Keieger & M.Pleaset, PB Rept /826 (1945), p 6 F. Bellinger, Ind. Engs Chem 38, op 160-9 (1946)
 R. Levy, Chimie & Industrie, 57, 221 (1947)

7) J.G.Tachinkel, Chem Eag News 32, 2582-87 (1954) "Propellanes for Ruckers and Space Ships".

Rocket Signel Simulating Davico (15 cm Baketen Scheinschung Gerit, abbrevianted as RSSG). See under Pyrotechnic Aktipathinder Devices.

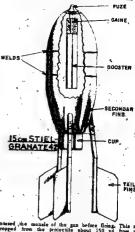
Resided Bomb to Stick Granade (Stickgranate). The following modded projection are described in TM 9-1985-3 (1953), pp 383-4 a 498-500;

303-6 a 405-310;
3.7 cm Pak 41 (Penzeraberhtkanone 41) consisted of an egrishaped bead (body) nod a cylindrical tail provided with 6. fins. The head contineed a shaped hamasing charge consisting of 5.28 b of 60/40-70X/YNT burnting charge consisting of 5.28 lb of 60/40-RDX/TNT (2 blocks umpped in was paper), two boosters (KzZdig),



a new lane (AZ 1975) and a base have (BdZ 1130), the mill postion of the projectile consistent of a red from the mill postion of the projectile consistent of a red from the projectile of the gas, and a concentric professional state of the gas, and a concentric Editor (FdEP), de from the projectile of the projectile (FdEP), de from mode an interpolation. Tour weight of projectile the projectile (BZ 10 in all owners in projectiles. Tour weight of projectile (BZ 10 in all owners in projectiles.)

o) 15 cm Stielgramte 42 used m 15 cm slG 3) (#\*rbwebrlifatorieriegeschitz 33) (Beavy Infanto Gus) consisted
and alliquiteshapped body, 11.5\* max diameter, and
and control of the street of the stre



charmed the manuale of the gan before firing. This med dropped from the projectile about 150 pd from the muzzle. The bonh was propelled by 12.1-11 bed pre-projectile by 13.1-11 bed pre-p

(See also Stick Hand Greands) .

Robeitsonminder Pulver (RZP). Fixely pulverized iron prepared by atomizing moltan cast iron by a cone of moist as at a pressure of 2 to 3 and, During this process most of air at a pressure of 2 to 3 area. During this process most of the cathon was origined to CO<sub>2</sub> and thus removed. A large part of the tron was histo oxidated during atomizing byt it was necovered as purel iron on thesequent cooling in what rend reduction with hydrogram. This powder was used to be a compared to the control of the contro of military ane. Reference: CIOS Final Rept 595 (1945), p 52.

Ribermoulver (RP) (Tabular Propellent). A propellent similar in form so the British Cordice. The compositions of some tubular propellants are given in Refs 1 and 2.

a) NC 64, NG 33 and waseline 3% (Ref 1) b) Generation (Schiesawolle) 66, TNT 25, DNT 5.5, centrality 0.5. K bitartrafe 7.0 and moisture 1.0% (Ref 2,

c) Collection corses 32-34, supported 32-34, NG 23-29, centrality or urethane 4 to 7, Am exalate 0.5, Na bicarboness 0.5, graphice 0.1 and moisture 0.9% (Ref 2, o 136). References:

1) E. de B.Bamati, Explosives, Van Nostrand, N Y (1919), 2) ri.Brunswig, Das muchique Pulver, W. de Gruyter,

Berlin (1926), pp 134 & 136.

Ribberspulver C/32 (RPC/32) (Tubular propellant, painter 1932). It contained NC 64-76, NG 36-57, Et centralite 1970, 197

Ribranguiver. C/38 (RPC/38). (Tubular propellast patters 1938). According to the Manual entitled: German Artillery Projectile and Fuxes, published during WWII at the Abendeen Proving Ground, Md. p. 183, the RPC/38 proprient was used is 150 mm HE Projectic, 4.5 calibers long, with point decompting have under ballistic cap. Although the point oxyments make under bailistic cap. Although the composition is not given in the above menual, it is easily to savene that the RPC/38 was one of the disthyleneglycoldisizes propellants developed at that time by Gallwitz (See \*G\* Pulved).

Referencese (Rew Propelient Mass, called also flaw Pastel. This was a mixture of water-wes nitrocallulose with an explosive oil which consisted of one or assural organic nitric acid estern, such as NG, DEGDN or TEGDN Such mixtures could be safely transported when the smokeless propellast plant was not located adjacent to the plants menuterrating NC and nitric enters. For instance, the Linemel Fabrik of 'D A -G manufactured NC and pressur acid enters, while the Dunneberg Fabrik, situated about 4 miles away, made the solventless propellants. As it was not safe or convenient to ship liquid explosives, the Krammel place mixed them with water-wet airrocelluloses propd by blending guncocron (Schienawelle) (Na13.15% to 13.7%) and collection cotton (PE-Volle)(Nal1.30 to 11.45%). sacked the mixture in rubbre-lined lines bags and shipped them to the Dinneberg plant to be used for the preparation of solventiess propelles m.

For the prepa of Robpulvermasse about 280 kg of NC (calculated on the thy weight), was stirred for about 10 minutes with water. About 120 kg of a nitric vater was added to the mixture and stirring was continued for 10 ainutes. The shorty was then transferred to a contribute where the water content of the mass was reduced to 10-15%. The resulting Rohpulvermanne was packed in rubber-lined lines bugs and transported to the Disneybers plant,

When received at the plant, the required number of bags were emptied into large drams, witter the contents of the bear were blended, the mixture was transferred to the prehented Werner-Pfleiderer kneaders. The other jouredients of propellants such as sub-lixers, graphite, Mg oxide, etc. were added in the kneader and, after allowing the blend to mature for about one week (two weeks for NGs propellants), it was passed through a hellical screw oreas in order to reduce the moisture content from 30-35% to about 8%. The partially debydrated product was fed to horizontal rolfs, diameter 0.4 m length 1.0 to 2.0 m and

rocating at 11 rpm. A temp of 70-80", was used for DEGDN powders. The time of processing was 18 to 30 minutes for a 15 kg sheet. Between 3 and 5% of mointure was allowed to remain in cannon propellants. The resulting sheer was trimmed to size and would on a bease mandrel about 134 diam. The sheet could also be used for the preparation of evenuted propellance. The extrusion should immediately collow the colling while the sheet is still hot. It was claimed that the inclusion of 0,25% MgO facilitated the extrusion. It does not neem that any wax was used for lubrication. The resulting extruded propellant contained 3 to 5% majorure and had to be dejed in stores to reduce the moisture to 1.0-1.2%. Reference:

O.W.Stickland et al. General Summary of Explosive Planes. PR Repr 925 (1944), pp 6, 10 and 65.

Rahtel AGerman designation for Crude Trinitrotolumes.

Remainit I (Rompezite I)-A mining explosive coars and proximately. Am attrace 56, NG with nitroglycol 8 to 10%. the rest being INT, aluminum and other incredients.

F. Weichelt, Hendbuch der gewerblichen Spreagrechalt. C.Marhold, Haile/Sanie, (1953), p 37. (See also Donarir and Gelacine-Romogrit).

Retirends Tremmel (Rocating Drum). As apparatus for determining the velocity of detonation and for other purposes. See meseral section and also A.Stretbacher, Spreage and Schieseroffe (1948), pp 11-12.

"Reven" Separates. This appearance, maculted at the Kellaned Fabrik A-G in conjunction with the Hollideder heaters, was used to remove the fines of NC from the visary as fines as they were specimed on bestup. A considerable saving in power and in time was classated for the Rotten, Relisence: A.A.Swanson & D.D.Sager, CIOS Rept 29-24 (1946), p.7.

Reyel-Tiger (Königetiger). See under Panner.

RPC/12, One of the enricest agreentless propellages, it was prepd about 1909 by Thieure and collaborators at the Zentralletelle für Wissenschaftlich-technische Untersuchungen in Neubabelaberg by iscorporating 70 pasts of NC (Na11.7%) width 25 stof NG and 5 p of centraline. It was suitable for one in large caliber gons [ P.Tavemier, Nem poud 32, 253 (1950) ]. (See also under Propellants, Artillers).

RFC/32 (Röbrespilver Construktion 32), A tubulger peopulant survoluced in 1952 for use in the 150 mm-herial further, and the survoluced in 1952 for use in the 150 mm-herial further, and the survoluced in the 150 mm herial further, and the survoluced in the 150 mm herial further, and the survoluced in the 150 mm herial further, and the 150 mm herial further produced in the 150 mm herial further and the 150 mm herial further

RRP (Rauchloues Rottweiler Palver), Smokeress propellant manufactured at the beginning of the present century by Verenigte Köln-Rottweiler Pulverfabriken in Varramberg-This propellent was exported to Belgium and other countries. Reference: J.Daniel, Dictionnaire des Matières Explosives. Duned, Paris (1902), p 696.

R-Salz (R-Salt) described in the general section as Cycletelmethylenotrinitre semine, was peopl in Germany, be Roger et al by treating hexamethylenetetranine (hexamine)

with nodium nitrice in acid solution.

R-Saiz was proposed as an ingredient of explosive BIKINGS. Table 57 lists these explosives

Teble 57

Cer 170

			CIPIDALISES			*.	**	
· · · · · · · · · · · · · · · · · · ·			Сопро	sition (%) o	Mixtures:			
Ingredients and Som: Properties		1 2	3	2.4	5	6	7	8
R - Sala	96.5	46.5	36,5	46.5	36.54	96.5		
Phenotheune	2.5	75	2.5	2.5	2.5	70.3	36.0	40.0
Diphenylumine	1.0	1.0	1.0	1.0		1 : .		-
RDX (Hemogen)	1	50.0	50.0	1.0	1.0	1.0	1.0	
Aleminus powder	1	70.0	10.0	-	40.0	٠,	50.0	40:0 (H <sub>e</sub> )
K airrage	1 200		10.0	50.0	20.0		٠,	20.0
Dimethylethylenedine samine		1 2	1 '	20.0	-			
Linecronated		1 .	1 -		-	-2.5	12.0	
-	<del></del>						1.0	k •
Casting Temp C	92	92	95 ,	94.	. 95	92	84	
Density (cost)	1.55	1.65	1.64	1.77	1.74	1.55	1 7	1 .
Velor of Deton, m/sec	7600			6100	7750	7850		1 .
Pb Pines Test. The sexure is more	INT	Cyclo-	40/60	40/60	40/60	10,00		
effective than	1	tol	Amerol	Ametol	Amerol	· .	-	1.
Fragment Density	66 m	47 m -	47 m	47 m		. `	1	
Test (TNT = 40 m)	1.	•					-	
Stability at £00°	Satisfue	reary scabili	ity for all a:	rologives	,			•
Exadetion at 70°	No sarad	stice for ac	er of the ex	plosines				5

a) H, is Hexogen (RDX) phlegmatined with 5% Mosten was

Reference: G.Römer, Report on Explosives, PBL Repo 85,160 (1946), pp 3-15.

b) Missure (8) was claimed to be very powerful

c) R - Salt forms with 26% dimethylenedimitramine (DMEDNA) a outsexic mixture, freezing point (fr p) 74°, Fr p of R - Salt with 10% DEMEDNA in 39° and with 3% DMEDNA 93°. Fry of R-Salt alone 104-106° and of DMEDNA 137°.

#356 (Raketen Sebeie schussgerid). Rocket Simulating Device. See under Protechnic Antipathfinder Devices and also in CROS Rept 32-76 (1945), p 3,

RZ 73 "Hight". A 73 mm air-to-air missile developed in 1941 by converting an Anny rocket, it used a solid pro-pellant, and could be considered as the predecessor of RAM (e v.). Rozervoce: S.W.Gatland, Development of the Guided Missile, "Flight -Polification, Landon (1952), pp 122-3.

"RZ" Smoke Carteldon. See under Smoke Composition

\$-1 to \$-18 Emploalves. See under Unterwannerspres assolfe.

\$4 and \$4 and Explosives, are under Frantzappmentoffe.

\$-16 and \$-19 Explosives.Sec under Erestasprengatoffe.

5-19 and 3-22 Hose Emplosives. See under Ernntzaprengstoffe.

\$-22 and \$-24 Hose Explosives. See under Eruntzaprenastoffe.

Select Projectife (Treibspiegelgeschoen) consisted of a relatively small substaliber projectile carried in a relatively large casing (subot) of softer meterial. The larger was discarded as the projectile left the bore of the gua. The principle of this projectile une to have a large nuclace expensed to the pressure of propelling games and then to have the surface reduced no ties the air reaissance became small. These projectiles were sover very accurate.

One type of German sabot projectile was armor-prercing and consisted of a sintered tungsten carbide core and the softer sabot which was not discarded until the core began to penetrate the target (such as the armor of a tank). After this the core disintegrated, which chused a deadly

spray of fine fragments inside the target (such as a tank). Some, of the sabot projectiles, described in Ref 2, were provided with one or two discarding hands, each in one piece. They were fired from normal ridled mas. Some of these projectiles were called Disintegrating Rotating Bands Projectifest q v i. Referencest

1) L.E.Simon, German Research in W II, Viley, N Y (1947), p 189

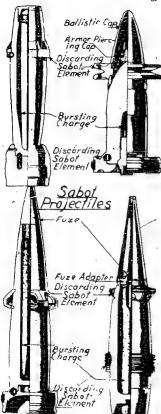
2) Dept of the Army Tech Manual TM 9-1985-3 (1953), pp 363-70 ' (See Jrawing on next page).

Sefety July Dynamire. One of the older permissible ex-

plosives: NG 32.25, colled cotton 1.25, glue-glycerindezzzin jelly 9.60, tye flour 18.00, Am nitrate, 22.60, No mixence 10.80 and K chloride 5.30%. Reference: P. Naoum, Nitroglycerin, Baltimore (1928), p 407.

"Safboll"Code name for either 99.5% HOROmittic acid or its mixture with 5 to 10% sulfuric acid when used as an experience of the course of the co (q v ). H.30, was added to suppress correction.

1) CIOS Rept 28-56 (1945), p-26 2) TM 9-1985-2 (1953), pp 216 at 231,



Salls (Salite) One by the older permissible explosivent NG 11.2, collection corton 0.5, Am nimer 33.6, DNT 8.5, Na chlorate 23.1 and carbohydrates 2.5%; Iranal ment value 287 cc and charge limits 600 g.

Reference: A. Marshall, Explosives, London v 1 (1917), p 397.

Impoternauce, See Nitric Acid.

Sanger-Bredt Minnile, called Antipadel Bomber, was a supersonic rocket designed by Dr. E.Sanger before 1942 but the project work was abandoned without any practical development. This design embodied many unique leasures. which are briefly described by Gatland on pp 57-8. It was planned to use the tocket in regions above a dense armosphere. Each time it dived and hit a denser layer of art, the missile was supposed to bounce upwards. These movements would produce a kind of wave-shaped trajectory, similar to that obtained when a flat stone to received across water, but much less prosounced. As each plus ge into a denser sir would result to a partial loss of kinetic energy of the manie, the instally long jumps would godbecome shorter, finally to be transformed tuco as even gliding flight, it was presumed that this method would achieve a stable flight and a more accurate trajectory to a segion above dense are, where conventional mightles usually behave temer ematically. The rought was designed to be campult launched and to be propelled by an oil liquid oxygen marute, its calculated characteristics were: aunching weight 220,500 lb, overall leagth (less bonates) 91,8 ft, width of rectangular section 5,9 ft z Il.8 ft, maximum mage 14,600 miles and maximum altitude 93

Reference: K.W.Gadand, Development of the Caided Missile, "Flight" Publication, London, (1992) pp, 57-8 & 124-5.

Sorin. See noder Trilone.

Setamerhon An ignitor coats a compressed mixture of meal powder (Mehipulver) with a slow-barning authorance such as a mixture of sulfar and K nitrate.

Reference: Kann-Marr. (Acanische Untersuchung, (1944), p 535.

Sauerstoffkilmun oder Sauerstoffwert (Onygen Balanca or Onygen Value), albervjared to O B - It may be determined in the manner described in the general section or by the method; given in A.Stettoucher, Spreng- und Schiesscoffe, Zürch (1948), pp 16-18.

Soulenknesmeschine. See under Knetmachine.

Samula Pulver, One of the pm-WW II specing amobales a propellanus: guarotton 95.0. TNT 4.0 and gulatinizes with some moisture 1.0%.

Reference: H.Branewig , Das muchlose Pulvez (1926), p 134.

Schoffner - Glückli Furedwood Comb, invented before WW II to Austria, was later improved and success it the Troisodorf Fabrik, D.A.-G. it is briefly despend in BIOS Final Rept 644 (1945), pp 9-11. In Commony, this comb replaced the \_Borriously used Kramichfeldt para-board galrano-typic comb.

Scholdemohl (Dant of Picked Ore). A matture counisting chestly of Ca and Mg silk-tares was used during. WW II in some subscitute explosives (Ersexzaperapatolle) as an extender of nitrocoopounds wal-h were not available during the war in sufficient fauntity.

Reference: PR Rept 190 (1985), pl. i.

Schiessboumwolle. See Schiesswolle.

Schlossboches. A cifled, culiber 30 mm, dascharger cup which could be fatted to most types of German cifles. Was used for launching some antenank rifle grenades. A photo of the Schressbecher four so desception is given in the Onlannece Sergeant, October 1945, p. 9.



Schlessmörser (Shooting Mortar). A device used for testing mining explosives in galleries fif ed with firedamp and/or coal dust.

Reference: M. Lupus, S.S. 20, 190 (1925).

Schiesawelle (Guncotton). Nitrocellulose of 13,2-15,3% nitrogen comunt, corresponding approximately to the Amer Guncotton. It was twed it, the manufacture of some numbeless propellants (See also Nitrocellulose and under Propellants).

Schlanswelle (Schw) Explosiver. See under Unterwasser-sprengenelle.

Schleavelle 18 ader TSMY1-181. Au explosive described as Mescambe (ferensie) in the general section. It consisted of TNT 60, hexamitociphorplusine 24 and Al powed 186 and was used in an miner, orpodoes, depth bombs and underwater demolition charges.

1) A.Stettbelcher, Protar 9, 33-43 (1943)

2) H-Marnour, Protes 9, 62-63 (1943)

3) Allied and Enemy Emplosives , Aberdeen Proving Ground, 34d, (1946)

4) A.Stertbaches, Spreng und Schienstoffe, Rascher, Zürich (1948), p 78.

Schlogunite. (Striking Distince). Same as Detonationalibertragung.

Schlogwettersichere Sprangs'affe, oder Wettersprangstoffe. Explosiven nale for use it, coal mines with fire damp. (See Wattersprangstoffe, p 226 and also Sicherheitzsprangstoffe) References:

1) A.Stettbucher, Schlens- and Sprengatoffe, Leipzig (1933), p 246

2) C. Heyling, K. Deekopl, Sprengstoffe und Zündmittel, Berlin (1936), p 105

3) A.Stetthacher, Spreage and Schesutoffe, Zürich (1948),

Schläguertesversuchtriecke, eder Versuchstrecke, Einedamp Lexing Casleny). Description of galleires for terring explosione in a grant of their statishing for use in gazenet planning in regard to their statishing for use in gazenet section. The first iteman galler, as given in our grant section. The first iteman galler, as given in our grant spilliers were: Denne, near photomost, College Cermany galleries were: Denne, near photomost, College Cermany galleries were in the grant grant grant galleries before galleries beforegage. The prints manufacturing mining englosivers, such as Schlemerch, flitzerin, Castep et Ony of the newest planties under him Schlemerung zu Freiberg (Sachhech.)

15 A. Marshail, Explosives, London, v 2 (1917), p 584

2) A.Schemot, S.S. 24, 288 (1929)

1) A.Stettbacher, S-hiess und Sprengatoffe, Leipzig (1933), pp 248-250.

Schmidding Geren 33 (SG 33). A rocket booster unis revented by Schmidding to increase the thrust of Hs 117 migrille thus assisting its take-off (TM 9-1985-2(1953), p 201].

Schnecken Pesses (Nom Pess), in order to reduce the time of the rolling operation and to reduce the power consemptions in the manufacture of solventiess propellants, the Linnberg Facoti of Dynamis A-ts rolline di NC-NG 12-10. The power of the Linnberg Facoti of Dynamis A-ts rolline di NC-NG 12-10. The season of this passe had previously been reduced to state content of this passe had previously been reduced to state of the passe had previously been reduced to state of the passe had previously been reduced to the passe of the passe was used in the other propelled plants, in order to achieve such good dewatering the usual reactivity of the passe was used in the other propelled plants in the passe was previously the passe while the partially debydrate as examped though the slots while the partially debydrate (carpted), squeezed out mady for rolling into sheets (carpted).

946), p 7

Schnellminn. See Panzerschaellmine under Landminen.

Schnellzeitzünder (Quick Time Ignirer), called also in-

Sebnellzeitzünder (Quick Time Igniter), called sice Instantaneous Fuse und Quickmatch. Some German igniters, such as Domnerumder und Eschbechzünder are described in Beyling-Drekopf, Sprengstoffe und Zündmittel, Berlin (1955), p. 229.

Schnorkel ader Schnörkei (Misspelled North-German word Snorkel oder Snort, messing Nose). The Dutch had fitted their submarines with an air intake back in 1940, and the Germans modified the device and called it Schnöckel. It consisted of a tube (about a dozen meters long), one end of which was connected to submarine Diesels, while the other end protiuged above the surface of the water. The tube was divided lengthwise into two compartments - one for suction of an from the outside and the other for removing the games of combustion of the Diesels. This device permitted the submarine to operate its Diesels while temaining in the submerzed condition, in case of denter, the Schnörkel forded horizontally and the supmarine submersed to a depth of as much as 700 m (or even 400 m. as was seported for the Submarine 211. As the married of the Schnörkel was usually non-metallic, it could not be detected by today.

Due to the fact that the Schnorkel used during www index an supply as amount of air sufficient to replace all the found are an aubmatine, 2.2 was necessare to resurface the submatine after several hundred kilometers of underwater travel or equivalent distance. The maximum achieved in an unmaterupted endowinged cognition was 500 km.

Gez 173

1) A.Ducrocq, Les Amers Secrètes Allemendes. Paris (1947), pp 20-24

2) H.Schaeffer, U-Bonz 997, Norton, N.Y. (1950), pp 182-3.

Schappen-Ringler Test, According to Sheldon (Ref. 1) this test was used in Germany to determine the autobility of cureps paper issended for the manufacture of antocellabour. The Schoppen-Ringler Tester was origanally introduced into the paper isolatory to determine the freezens (alrowsas) of the wood pulp. The setter operation on the same principles, as, the Canadian Standard Freezens Tester (Ref. 2).

Reterraces: 1) L-Sbeldos, PB Rept 12,662 (1945) 2) LN Stephenson, Edit, Preparation and Treatment of Wood Pulp, McGaw-Hill, NY vol 1 (1950), pp 943, 931 & 935 Con also Forcesas and its Testing, in the general section).

Schronadiaranita, See Shrapeel Shell,

Labourationes Links. See under Leadnines

Schools Elindor (Provision Type Igninet), files called Mebel-ulleder (Lover Type Igninet) is briefly described under Igniners and is 14, 9-198-2 (1953), p 296: it was used in the Glassian 43 as a allerative to the Buck ignine.

Scholer Palver (Schuler Powder) - An explosive patented in 1893: K chlorum 60, pulverized anthractor 25 and augus 15%. A similar explosive was used by the British under

the same Schindler Powder.
Reference: Daniel, Dictionnaire, Paris (1902), p 705.

Schultus Pulver (Schultze Propellant). A smokuless propellast prepdiabous 1865 by Major Schultze of the Prunnian Artillery, by nitrining purilied (de-reninated) wood (in the form of small square-cut pieces), followed by washing and builing the spaulting Nitroligaoue with water and then drying. After this the grains were imprepated with a a concentrated solution of saltperer with or without Ba nitrate, and deied ugam.

Although this propollant was appreciably alower burning than earlier-smokeless propellants consisting of straight comprehend nitrocotton (anch as Von Lenck Propellant), it was still too quick for use is siller, akhough quiur anizable for abotems.

Schultze propellines was manufactured not only in Germany but also in England (1868) and Austria (1870). but it did not achieve may success until it was modified in England by Griffiths and in Austria by Volkmann, The Anatrine propellant was made by parely gelatinizing the Schultze propellant with a mixture of ether-alcohol and it became known as Collodin. The British modifications beginning in 1883, contained nitrated wood pulp instrud of previously used sittated wood. The composition of the British sporting Schultne propellent is given in Marshall (Ref 1, p 327).

The composition of German Scaulter propellant given by Branswig (Ref 2) was an follows: collodion cores 40. guacottos 40. Ba sitrate 10, vaseline 8, moisture 1.5 and gelatinizer 0.5% References

1) A.Murshall, Explosives, London v.1 (1917), pp 47 & 327 2) H. Brunawig, Das rauchlose Pulver, Berlin (1926), p 134. Sabilmine One of the Land Mines. See under Landmines. Reformer TM 9-1983-2 (1953), p 278.

Schwas Ge P-40. Hollow charge n.C. greaner describes in TM 9-1985-2 (1953) pp 337-8. (See also under Rifle Greendes).

Schöltzenmine. Same au Schlimine.

bisck powders

Schwarzpulver (Black Powder), Composition preparation and properties of black powders are given in the general section.

Table 58 lists come German military and commercial

		eponitio	
Designation ()	K si-	Chan	Sulfree
Georhitapolves, PPC/73	74.0	16.0	10.0
(Campa propellest 1875)	1		
Milsteir-Gewehrpelver 71	76.0	35.0	9.0
(btilicary rifle propelling 1878)	l .		
Militärpulver (current)	75.0	13.0	10.0
Marine Genchatz Pulver	75.0	16.0	9.0
(Nery Guspowder)	1		
Jagdpulver tilmmingen	78.3	11.5	10.0
sporting powder)	1	1	
Sprengpulver (Bluscing powder)	65.0	20.0	15.0
manufi by the Pulverfabrik	70.0	16.0	14.0
Speadeu	74.0	16.0	10.0
·	66.0	21.5	12.5
Binseing powder	65.0	18.0	17.0
	(No ai-		
	(rear)	-	
Blasting powder B	76.0	14.0	10.0

## \*Beech charcoal

References: 1) Gody, Trainé des Matières Explosives, Names (1907), p.71 2) R. Escales, Schwarzpulver, Leipniz (1914), so 160,169 a 353 3) A. Stettbachgor Schienes and Sprengstoffe, Leipzig (1933), PP 97-112

4) E.Sascho, Química de los Explosivos, Madrid (1942), pp 277-9 5). A.Szerzbacher, Sprenge and Schliengroffe, Zürich (1948),

PP 58-9.

Schwefelshore. See Sulfusic Acid.

Schwargefrierbure Dynamics (Diff culcly Freezing Dynamics), called also Ungefrierbure Dynamitu (Non-Freezing Dynamiten). See Low-Freezing Dynamites in the general section,

Sersoning Mint. or Screening Messale. According, 10: U.J., Bullock of Picathyn Arsenal, Screening Mint was the necessary of the control of th

weapon, also nicknamed Woof-Woof, is briefly described in this section under Rocket Launcher (See also the general section).

" - Thirty "

References:
1) W.B. Larson, Infantry Journal, September 1944, p. 23
2) Amon, Intelligence Bulletin, March 1945, pp 2-4.

Son Dog . See Seehund.

Son Morker Bomb. See under Marker.

Security . See Sekurit.

Securation . See Sekurophor

Soohund (See Dog) (Chica de mer in French). The "packer" submarine (16 tons) with a radius of action of 500 km invested near the end of BW IL Its crew consisted of 1 or 2 men and it engried 2 torpedoes, it was provided with a small Diesel, generator, storage batteries, electric motor, oxygen tanks, and so arrangement which allowed is to submerge to as much as 10 or 60 m. This was an effective weapon which could do considerable damage if : used in large numbers.

In addition to the Seebund there were two other models of pocket submarises both propelled by electricity. The our, mightly larger than the Seehund, was called Maich (anlamander), while the other considerably smaller, were colled Blber (beaver). (See also U-Boot, 'Ope-Man).

References

A.Ducrecu, Les Armes Secrètes Allemandes, Paris (1947). Pp 31-33.

Soldler Sprengetell. A permissible explosive patented in 1892 by Seldler of Serlin. It was prepd by blending 77 parts of K mitrate with 23 p of the Na salt of anothalene-betamonosulfonate, "CaoH SO ONa [ Daniel, Dictionnaire (1902) p 712 %

Schundistadung (Secondary Charge), called also in English Base Charge, Hain Charge, or Lower-Charge, A charge in detoeators or blasting caps which is placed underneath a primary or an intermediate charge. A secondary charge wouldy consists of a high explosive more sensitive to initiation than cast P A or TNT. The usual base charges were; compressed cettyl, PETN, or RDX, while charges occasionally used included-conferred P. A. and hexe-

Solute (Securior). A type of mining emplosive based on mono or disimobenzenes mixed with an oxidizer such as As or K nitrate, passated about 1886 by F.Schöneweg. Table 59 lists some securites

Сопромения	Securities					
Company	1	2	1.3	. 4	5	1
Am pitrote	T -	-	37.0	-	-	1
K-nimace	74.5	77.7	34.0	81.8	18.9	L
MNB with m-DNB	-	-	29.0	-	70.5	L
m-DNB	25.5	19.4	, -	15:2	١.	ı
Am ounlaps	1 - 3	2.9	-	3.0	۱.	Ł
Mitrocellulose					306	Ł

Reterences:

Ger 174

1) 1.Daniel, Dictionnaire des Matières Explosives, Paris (1902), pp. 710-12 2) L.Gody, Traité des Matiètes Explosives, Namur (1902),

PP 597 & 708 3) E,Colver, High Explosives, London (1918), p 141 45 F.M. Fumer, Edit, Condensed Chemical Dictionary, Reinhold, NY (1942), p 291,

Sakuropher (Securophere). A type of mining explosive

menufd in Germany prior to wh I.

Table 60 gives some examples

Toble 60

	Securophores				
Compensits	1	. 8	. 3		
Am nitrate Ba nitrate K sizzate NG Collod corton Sabacic acid or its eaku Na chloride Rye flour Vood seel Liquid-bydroctathon Na cabonate	27.0 40.0 1.0 12.5 10.0 2.0 3.5	24.6 36.4 0.9 11.4 9.0 9.1 1.8 3.2	1.0 34.0 15.0 38.5 1.0		
or bicarbonste					

1) L.Gody, Traité des Matières Explosives, Namus (1902). pp 713-714

2) AlMarshall, Explosives, London, vel (1917), p 376.

Selbatenzindung Prebe (Spontaneous Ignition Test) for pyrotechnic componitions and their ingredients is described in Kast-Metz, Chemische Untersuchung (1944), P 535, Salf Carrying Donalition Charge is described under Knimmel

Factory, Dynamit A -G.

Solf-Destroying Bullet. See Self-Destroying Tracer Bullet. Salf-Doutering Fuss, ZZ, 1305, developed by the Deutsche Naffers una Municipanishtikes A-C., Libret, was used in the 20 mm when the control of the control of the Like fuss AZ 1502 it was of the sensitive type required to function on a 2 mm paper screen at 100 meters. When the projectile was fired, the centriquel force caused the

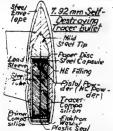
the projective was lired, the centritugal force caused the sweet balls (3) to ily out into the enlarged portion of the retainer ring thus locking the percussion plunger and its compressed spring in place. The arms force caused the brans spiral ribbon to uswind and increase in diameter and the shoulder, on the surker could pass through its renzer. By this time the projectile was a few meters away from the muzzle of the gun and the projectile was armed. On hitting the target the steel balls went back into their

On hitting the target the steel build went back into their housings and the litting fint, activated by the compressed spring, perced the primer cap.

If no import took place within a range of about 2000 meters, the appear of votation dropped on such an extent limit the threat of the full regainst the major and the size of the si References:

References: 1) IL-Peploe, CIOS Rept 33-20 (1945), pp 69-70 2) Anon, TN 9-1985-3 (1953), pp 548-9.

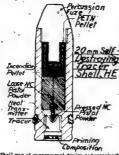
Self-Bostraying Treeve Bullet (Spitzparchoss mit Stahlbern, Lewchapper mu Zerlegung) calbaby 7:37 um, developed during WW II by the Deutsche Vallet und Wentictons birther A-C, at Lishet, was intended to be used to practice fising, it consussed of a used cassage containing a leval slewwy which sectioned a mid sevel-field, a seen, a leval slewwy which sectioned a mid sevel-field, as seen in the William Consistence of mid sevel-field and sevel table with theory and primer compositions. The ME filling consistence of PETN 40, Pb axide 45 and Turneyeau



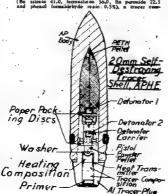
13%, whereas he pistol powder correlated astrocellulose with an ignition temperature of 100°. The bullet was much as a particular temperature of 100°. The bullet was the produced by the bernary of the maps, because it the least produced by the bernary of the produced by the bearing of the produced by the produced by

Solf-Destroying Trucor Shells, caliber 20 mm, developed by the Destache Waffrer und Municipesfabrikes A G as Lubeck, included the following: a) HE Shell for Aircraft Gane. It was of conventional

a) HE Shell for Aircraft Guna- it was of conventional design and constanct: a percussion have, a HE filling (PETN pellet), an intendiary pellet (Mg/Ai alloy 50, Be aircraft 49 and phenol formaldehyde ream 15)," a loose piarol powder (airtocelhalose), a pressed piarol powder, a beau transmitter, a tracer composition (two increments, each person of a 3000-000 kg/cm²) and a spaning composition (present at 3000-300 kg/cm²). If the shell was not exploded by the percension flight in was self-enteroyed face about 0.3 seconds of light At this answert the lame from the hast portion of the tracer ignated the pisted power which in term quanted the sacendary pellet. The interest home produced by the tracer ignated of the tracer was ready to the composition of the tracer was ready to the pisted power which in the tracer was ready to the pisted power which in the spaning of the tracer was ready to the product of the tracer was ready to the pisted power to the pisted p



b) APME Shell was of conventional design and contained: a HE filling TPETN pelled, two detonators, a passed provider pellet, a best remainiters, a heating chapped time (Be mirate di.d. ferrossiscen 56.0). En peruside 22.3 and phenol formalistryle ressis. 0.5%, a traper com-



positions (two increments) and a primer composition with its united supplied with NC lacquer. For shell was designed by give a trace of 4.2-4.8 sec duration, possesses a 30 mm amore plane and to exploded in the shell was not exploded in the short possesses and the shell was not exploded in the short possesses and the shell was not exploded in the short possesses and the shell was not exploded in the shell was not exploded in the shell was not shell with the shell because the heat produced on deflagmation of the piscol powder, which, in com, was justiced by the theseing composition. This composition was incorporated in the shell because the heat produced by the tracer showe was not unfilterent to right the shell designed of the shell diameter of the shell of mo).

Reference: H.Peploe et al, CIOS Rept 33-20 (1945), pp 34-61,

Solf-Igniting Cushion. See Brandkinsen.

Self-Propolled (SP) Gun Mount [ Selbstfahrln fette (Sf pr Sfl) ]See under Pauzes

Sevestopol don A mortar gue, califer 500 mm, used effectively, by the Germane during WF II at the sing of Sevastopol, Russin. The gus fixed an 8 to a prospectife with manale velocity of 2200-2400 lives and maximum range of 29 miles. Veright of explosive was 2000 lb, wrt of propellant 2500, lb, wr of gas 1375 toos, and length of barrel 105 ft. It is probable that the propellent charge was consisted as a cylinderical carring under of a propellant couponision, and servine dunder that of the propellent couponision, and servine dunder that descripe Charges.

Note: This gut, was nicknamed Dorn or Gustav Geschiks (See also under Wespons).

1) PB Rept 925 (1945), p-18 -

 Aberdeen Proving Ground, Museum; private communication. Note: The projectile can be seen at the Museum.

oge Gaschaus. See Spitzgeschous.

Shaped Charge or Hellow Charge. See Hoblishing in this section and Shaped Charge in the jenomal section.

Shouthed Charge . See Mantelpatrone. Shall . See Gennare.

Shall hadd P rooms or 'te' Persons of Pacialism Casting's Wavels (Called also County process or Comise Nothing) developed in Geressny during WW II by J.Coning, nace possible the production of foundry moles and cores for cast settled in more intricate shapes and in larger sizes the thin shall make the production of control to the datherence of a mixture comp dry and and plantices to beated nextly pancers. Each shell mold was then haveloned by Interfer polymers because of the control to the production of the prod

The process is applicable to the manufacture of shells, bombs, grenades and rockets.

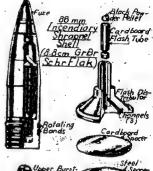
L'Creara, Ger Pol Application No 48679 (1949), described in PB Repta 8390) and 81234
 Bulk-Amen et al., The Foundry, August 1950, pp 92-96 and 206-17
 LL-Day, The Ison Apr., 169, 28 (jan 1972)
 Bulk-Amen et al, The Foundry, pure 1972, pp 112-17 and

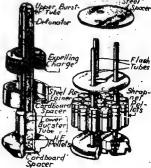
R.W.Tindula, P.B. Rept. 106640r(1952) (47 references).

Shatgun ar Sporting Prapolient . See Japipulver.

Shroppel Mine (Schrappellnine, abbreviated as S-Mine, sometimes called Schrappenmae). Two yppes, 5-35 and 5-44, are described in Ta 9-108/2 (1973), pp 779-81. The 5-75 nine was called the fruit Tin by the Buttish, though 5 the lack that these mines more into the sit to the sit of the s

Shropnel Projectile (Schinghellymanet). Only one nuch projectile, annely be 8.8 or Grane Erand Schippell Flag (88 mm incendary Shrapnet Schippell (48.6 mm). It described in TM 9-1989-74 (1933), p. 448-49, secure consisted of a thin steel shell of contentional design containing: 72 uncendary pellers, a point detendant





time foam (2425/30 kwrz.), en espelling charge (about 2 or of modelens propelland) and a bertraing charge (about 2 or of the charge of the cha

Shraped Projectile, Russian, la addition to the previously mentioned shraped, phojectile, the Geomean charge We II, ased the 70.2 fram Strapest Projectile, 42M, captured from the Russiana. The shell was filled with about 43 triangular piaces of statel 2.237 long-which were spected from the nose by a swel forcing plane behaved which was a charge of black prouder. The threads and the two remaining acrees



of the cells: were sheared by this action. The shall was fund from Ressian field game 7.63 on FE 296(n) and 7.63 on Fe 296(n) and Reference: Anon. German Artillery Projectilies and Funes, Ordennee Bomb Uhspoal Causer, Aberdeen Proving Geomet, Maryland (Anou 1943), '90 120-1.

\$M-Solu. The term used for RDX (Hexagen) prepared by the direct attraction of hexamethylenesetramine as described briefly in this section under Hexagen.

Steherholtsdynamit (Safety Dynamits), According to Suppbacker, Spreng- and Schreseroffe (1948), p 86, the dynamices which are safe to handle and transport are called Handhelongealthers and those of them which are safe to use in cost mines are known as Stwherholtsdynamity. The latter dynamites contain 20-25% of h 3 (or a low-freezing mixture of NG and nigrostycol-4/1 mixed with discreptions hydrin which serves an a phlegmatiner) and a "dope", such as Am nitrate, wood neal, etc. If the NG is phispmatized by means of collection corror, the resulting dynamics belongs to the Gelutinedynamite.class, such as the Ammungolutina. Neur in countries other than Germany, for example France and Switzerland, arometic nittocompounds, such as DNT. TNT, esc , were used as phlogmatizers in lies of dissitrochlorohydrin. Such dynamites were known as Hitropolotics dynamités,

(See also under Swize Explosives).

Sichundstuprengetelfe (Safery Explosives). According to Secribacher. Spreng- and Schienatofe (1943), pp 86-7; explosives under this mane were allowed to be tamported by rul. They contineed 20-00% Am niquite and spit more than 4X NG, the remaining being word medil, acconstitutive compounds, see. Daser explosives, known also may Ammonalphrengenequielfe were pulvershoot, very insensitive to impact, fairly unable and difficult to ignise. An example of spif Digitalizes in Donasti, Most of the Schartenstrangener foots, see also Schlagwethersickere under re-vate freedom lander degis gircelangh.

(See Wettersprengionite, pages 126 and 269-7, and also Schlagwenersichers Sprengentia).

Signal Device (Signalmittel). Under this were night be included: Hand, Smoke Signal (Handmunchreichen), Signal included: Hand, Smoke Signal (Handmunchreichen), Signal Fall (Handmunchreichen), Signal Pacie (Eschpaiole, Kampipiarole), Signal Pacie (Eschpaiole, Kampipiarole), Signal Projector (Signalmeter) and Signal fore), Signal Rochet (Signalmitater) and Signal fore), Signalmitater) and Signal fore), Signalmitater) and of the Signal fore), Signalmitater), Si

tellowing:

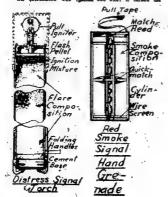
a) Smoke Signal Flare (p 80), is also briefly described under Flare

b) Smoke Signal Flare ARDR (p 80) is also briefly

described, noder Plate
c) Discress Signal Torch (p 81) consisted of a sheet
almaintm sylinder containing three present blocks of
a flare composition and n pull import with a flash
bellet and as insures composition

pellet and se ignation composition

J Red Souch Signal blassed formade (HomérapubasishianWelf 1973) consisted of i cardinact or inspections
Welf 1973) consisted of i cardinact or inspection
Pelluling 194 to que real analytic composition profits on the second polytic consistency of the second polytic control of the second polytic con



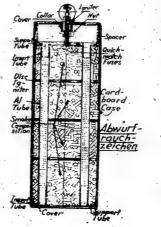
metic length the black powder disc was ignised. The flame was then communicated to the macke mixture flame was then continued to be small to the said of the cylinder. The signal could be placed or thrown. There was no similar own ge, yellow and violer signal was the signal of the cylinder of the control of the cylinder.

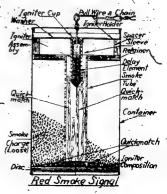
nigman (2) Hollow Chickee Signal Piscol Grennae' (5 344) is described under Piscol Grennades (5 345) is briefly described under Pincol Grennades (5 345) is briefly described under Pincol Grennades

Some of the smoke compositance used in tland Signals (Numberschieden) are listed under Pyrotechnica,

A smoke signal generator, designated an R\$\$Go Person 15 cm RZ is described in CIOS 32-13 (1949), p. 15. The derive consisted of a pane-board or limite enclosing 1-1 signal smokes composition containing flexs (branchloro-the control of the control

and opercury falmance: which ignized the delay cleanary when consisted of an upper charge (0.000 g of instance). As a surface of the consistence o





assembly, which included the delay element, was extended sate the central reflectant than Balow the ignime, ansale the central these, were located losse pieces of quickments (black powder) used to inclinious the Epsision of a smoke News In the green signal the pieces of quickmatch were

Incated in the caving. Following were the compositions of amoke mixperes:

Organic dye Lactore (CygHzzOgy HzO)	Geren 45.0 24.7	81mm 44.7 23.5	Red 33.7 33.7	Violet 48.7 17.7
K chlorate Jasolebles in H.O. (SiO <sub>2</sub> , Fe <sub>2</sub> O <sub>3</sub> , Al <sub>2</sub> O <sub>3</sub> , etc.)	28.5	7.3	17.8	26.4 3.6
Binder (by difference) Yeight of charge (in grass)	1.8	1.5	3.0	3.6

The signal was fired by removing the cover, pulling vaility on the injustre thain (by means of the pull ring) and the pulling the pulling of the composition and make the pulling of the composition and make the pulling the pulling the composition and make the pulling the 30 and mercusy turnsmare range comment (0.05 g of K mitrage 75 charcoal 16 and sulfur 9%). After burning for about 14 seconds, the liane from the delay element ignited over cords of quickmanch (black powder) which, in more, ignited black powder composition (1.3 to 1.8 g) on the the black powder composition (1.5 to 1.8 g) on the bonzon ignited dist and finally the smoke distincts. The's smoke from the baseling planter was forced through the small from the baseling planter was forced through the small case of the green signally, and there around the firstine ignates, and through the hole in the remained nature the space between the retainer and signest blader. The beast que pressure of gates generated on burning reptined the pressure of gates generated on burning reptined the allowing the same and the signal through the same allowing the same are the same and the same and the same allowing the same are the same and the same are the same allowing the same and the same are the same and the same are same and the same are the same and the same are same and the same are same as the same are same as a same and the same are same and the same are same as a same and the same are same and the same are same as a same are same as a same and the same are same and the same are same as a same and the same are same as a same and the same are same and the same are same as a same and the same are same as a same and the same are same and the same are same as a same and the same are same as a same and the same are same and the same are same as a same are same as a same and the same are same as a same are sa allowing the smoke to escape, it was assumed that the smoke bushed from the center ourward and from the boston upward. The duration of emission of smoke was 12 to 20

Signal Smoke Davice. See Signal Device.

Sileate-Sprengatelfe (Sileate Explorates) were chlorate explorated developed intole WW I by the Obsertchlesiache A -G "für Fabrikation / vom ' Lignous ('Schieus wollfahrik fue Armee and Manne). According to Escales (Ref 1, p 185) one type of Silenia was a mintage of & chlorate 80 (max) with 20% reain of which 4% could be in the nitruthe state, Another composition contained & chlorase 75 (max) ream 8(minim) and Na chloride 10% (minim). The resin had a m p of about 70, and the Na chloride was mixed with I took of its weight of parallis oil.

- Following were the compositions of some of these explosives:
- a) Silenia IV: K chlorete 70, resin 8 and Na chloride 22% is was suitable for bleating rocks and seen, but nor for use in excess coal mines (Ref 1)
- b) Silenia No 4: K chlorate 80 and reain 20%; it was suitable for blasting rocks and ores, but confused in gaucous or dusty coal mass (Rof 2 &
- References: -
- References:1) R.Escales, Chicampres proofe, Veit, Leipzig (1910). pp 143 & 185
- 2) A.Marahull, Explosives, Churchill, Lindon, v 1 (1917), P-586 00
- 3) E. Barnett, Explosives, Van Noscrand, N Y (1919), p 111.

Silver Anide (Silberazid) (Ag A ). See greenil section under Azides.

Silver - Fulminate (Silberfulminat), See general section under Fulminases. It was used in Getmany as a primary charge in the Assumittoneoin (q,v).

Silvit oder Pilett (Silvice or Picrite). A type of bleating explosive prepd by mixing pulved and piene acid (luft over from WF. 1) with 5 to 10% of squeous molasises or cellulose pitch, a earry product obtained by evaporating salfite liquor from the pulp industry. The composition could countie up to 20% of arometic aitrocompounds such as TNT. DNB esc. References

1) P.Naoum, Schiese- and Spreageroffe (1927) p 66 2) J.Pepin Lehallout, Poudres, esc (1935), pp 457-8.

Sinonydaeta oder Synonyd. Primary explosive mixture developed in Germany about 1930 to replace previously used mercuric fulminate compositions. It has been claimed that the products of decomposition of Sisouyd are acrecorrosive and do not prode fiteness. Ficheroulle and Kovache (Ref 3) give the composition of a mixture used by the General during VV II as follows: lead styphasis 25 to 55, tecracene 1.2 to 5, Be nitrate 25 to 45, PhO 5 to 10, Sh 5 0 to 10, Cn silicide 3 to 20 and powdered place

- References: 1) E. von Herz, S.S. 28, 39 (1933) Die eronionaftele Zándnas
- 21 A.Stestbacher, Sprung- und Zundenoffe, Zürich (1948). PP 98 at 106-7
- 3) H.Ficheroulle, A.Kovache , Hem poud 31, 26-27 (1949).

Shrored Iron and Steel Items, each an bullets, pyrotechal-devices, etc. are mentioned under Putrementaliargie.

Sintered from Protections, See under Tieffender Verfahr

Ship Bamb or Kort Apparatou, designated as SB 400 Kugol K is described on p 14 of TM 9-1985-2 (1955), (See also under Bombe).

Smull Arms (Handleverwaffen) , See under Weapons.

Small Arms Ammunithm. According to A.J.Dere, Ordnance Sergeans, December 1943, pp 357, the German small arms m was similar to American. The complete round assumation was assailer to Assertican. The comprise round consisted of a cantradge case, percussation cap (prince), consisted of a cantradge case, percussation cap (prince) can be captured to the case of the case was been seed, copper placed on both sides. The case was been seed, copper placed on both sides. The case was been seed, genowed at the base and conced nightly to facilizate resurdation. A prince pocker was formed in the facilization of the case was been seed to be conceded as a seed of the case was flash channels. In the center of the pocker an anvil was formed on which the prince composition was fired by the firing pia. The painers were of the Berdan type, either the No 30 or the 3.1 The No 30 prince consisted of a leasant cap commining the primer composition, and a covering position was put into the cup dry and was protected from dampages by the cap which was lacquered on the inside, The maide of the cup was also lacquered to the level of primer composition. The No 30 primer was essentially the same as the No 88 except that its primer composition was different and practically non-propers. A charge of a typical agent ame castillar convicted of a single-bate (nigrocellulose) peope last in blackish; square, graphite-treated (lakes about .2) mm thick and 1.2 to 1.5 mm long, with amouth-cut aretaces. A typical bullet had a boar-tail base amonth-cut arctaces. A typicas muset and a courtess muse and consisted of a lead core and sacker consuiting of either cupro-mickel, girling metal or copperpland sheel. There were hiso bullets with steel cores or made entirely of steel (See under Steel and, Iron Amministica Items), The ballet was crimped to the rattridge case in the conventional manager by means of a canpalure.

The following caliboras were commonly used during

A. 7.92 mm Amountium which can be subdivided into

the following types:

a) Perr as (Patronen achweres Spittgeachona), Heavy Pointed Ball Ammunition, had a builet with a least com and a copper-allow jacket. The annulus on the base of the carridge was painted green, if inbeled bane of the catering was passed green, if labeled an aimply Part a5, the amministion could be used where in office (such as Mouser or Green's 41) to machine great looks the Mouser of Green's 41) to machine great looks the Mouser of Green's 41, and the Mouser of Green's 41, and the Mouser of Green's 41, and the Mouser of Green's which was a such as consistent with jabel "Part & Li," in which the letters 11.6" indicated-that the rounds were clip packed. The Label "Part & Shr (ow" indicated that the rounds were clip packed. The Label "Part & Shr (ow" indicated that the rounds were clip packed. The Label "Part & Shr (ow" indicated that the rounds were clip packed. indicated that the tounds were designed for use in

machine gute b) Petr Self (Patronen Spittgrechoss mit Stahlkern), Amount tion in (a). The core was of steel and the somewhat longer than in (a). The core was of steel and the sacket of speel with gilding metal conting. The annulus

Round

Heavy Rinfed Ball Round (Patr sS)



ercino Semi-4rmor CPO rmor. iercina diary Piercing racer ใดบทัส Round rouna Dali Smk SOUR

Patr SmKH (Patronen Spitzgeschoss mit Stablkem Gehärted), Armor Piercing (Super) Assouration, had a. bullet with a tungsten carbide core and a steel jacket conted with gilding metal. The buller was painted

black and the annulus was red
d) Potr Smg (Patronen Spiezgeschons mit Eisenkern). Semi-Armor-Piercing Ammunition, was similar to the above, except that the com was of soft speel or iron (See also under Steel and Fron Ammunition (tress) Smallkern und Leuchapuri, Amor-Piercing-Tacer Ammunicion, had a bullet with a steet core and lead point filler enclosed in a copper-plated steel jacket. The tracer was usually breen chinging to red. The point of bullet was painted black and the annulus red. This round was used principally against sircraft

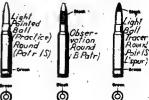
f) Patr Prak(Patronen Phosphas mit Stabikern), ArmorPiercing-lacendlary Ammunition, had a bullet with a steel core and a phosphorus filling, it was used against aircraft and on striking the earget a trace of white smoke was evolved. The annulus was painted eithe red or black and sometimes the case had a red band across the base

scross the base g. Portrosen, leichtes Spizzgeschoss), Light of Pointed Ball Ammunition, had would the with an aluminum (illing. This round was used (or antiairrest practice h). B.Part Beobachtungsgenchoss Patroneo), Observation Ammunition had a bullet with a core of high explosive, phones filled in the cases. It was an observation round, the purpose of which was to indicate by means of a puff of

the purpose of watch was to indicate by means of a purpose of watch was been the target was hit. The bullet was painted back except its tip.

Nour This bullet is described more fully under Observation Bullet. According to CION Report 35-20 (1945), pl. 11 was also debpend as a incendiary bullet for use against it was also debpend as an incendiary bullet for use against mire raft.

i) Paw 15 L'aper (Patronen leichtes Spitkgenchons mit Lauchtapur), Light Ball-Tracer Ammunition, had a bullet with an aluminum filler and a tracer (white)



ammonation was used to nattaircraft posttice." This amsocition was used in natisficraft practice. The tip of the bullet was panted black.

) Fore, "1888 (Patroors 318 Retustoff), Antitunk Rille Absolution which contamed as analy charge of haraysing agent. It had a very large cateridge case and an ampropherous; builed. There were two types

and in amporpherong bullet. There were two types of his assumption, or used in the Polithi<sup>2</sup> Annuau 120 his assumption and in the polithi<sup>2</sup> Annuau 120 his annual 120 his area of the time German copy, the Pall 39 (Panesetuiches 19). The Polith cound was much analler than the German which was marked 7.02 mm/13 mm.

Lower According to CLOS, Reps 33-20 11943), pp. 13-14. He German 2012, for the German and the German 2012, for the German 2012, for the German 2012, for the German 2012 of the German 2014 of

of (Chioning type Plassolen Parosen 08), Ball Assensation,
a Ball with a lend gote and a jacket either of
customical or gliding sectal.
b) Periphr of Eng (Pistolen Parosen 08 mit Eisenketh).
Semi-Armon-Pjete og Ammunition vetich bod sollet
with a mild sew! core and lend poun tiller. The

risches was of steel coated with gitting herst.

oge: fach of these rounds could be used in the following

Noise: Each of these rounds could be used in the following weakment: Lugar (Parchellum) Presch, Schweiserr Carbiner, Pather: Automatic Pistoly, Bergmann Submachine Gun, and Steyr-Solochura Submachine Gun, C. 13, mm (1814) Ammunithen could be subdivided into

the following types:

a) High Esplosive-Tracer Assermation had a baller containing some PETN as a burning charge, a point detending figs and a tracer composition. The built-

was painted reliew
b) High-Explosive-Incordinty-Tracer Assumition had

b) high-Erplowiv-inconding-Tracer Assemblion had a bullet containing the same imprehens as a bove plan the lag-fieldary conduction. The bullet was plan the lag-fieldary conduction. The bullet was the lag-field of the lag-field production of the lag-fieldary composition, giving other 4 white not present the lag-field was painted green with a white bullet market. The bullet was painted green with a white bullet had been builted to be a second to be suffered to the conduction of the lag-field with a yellow hand. The tence was had defined to the lag-field with a yellow hand. The tence was

pained black was a yellow band. Inc scace was fals green.
Note: The above assessation was used in the Rheinsmeall "Suleshum Fixed Aircraft Cannon MG 131. D. 15 cm (.397) Assessition could be subdivided into the

"Outside that A feet of Affects (Canada Mg 131,
following 1yan Annountiation could be aphilivided into the
following 1yan Annountiation and a halfer
containing a PEIN/Vine Silvet, a brase from the Containing a PEIN/Vine Silvet, a brase from Canada as a state of the Canada and the Canada and

bad in rous or are surring year.

b) high-Explosive-locundusy-Tracer Ammoniston had a bullen constituing the same lagredients as above place the incrediary pellet. The buller was yellow

plas he jocendary peller. The baller was yellow-via hish-base via vert-frace-fel-bus coving a Amenica-tion of the plant of the plant of the plant of the head a ballet similar to (d) but provided, with a self-entering wire. The hallet was painard eight of Tareet Ammanicon and the ballet peacard eight of the plant of the plant of the plant of the ballet painted black. Sometimes a yellow band was patamet is tout of the during jand.

Note: The above' ammunition was used in Masser Fixed Aircraft Cannon MG 151-15.

Altrough the annumention of calibers 20, 25, 27, 28/20
and 30 mm was considered by the Germans as belonging
in the small arms category, it is not secluded by us m in the small arms citatepory, it is not sociated by an amina technique beginning the best source and the production of the production of the second source of the production of the second source of the small arms of the second source of the small arms on a smaller before one of the small arms one property. (1) and only instead of the small arms one porty. (1) and only instead of the small arms one porty. (1) and only instead of the small arms one of the small arms. (1) and 10 mm are now included in that campaign and she of the small arms and 30 mm are now included in that campaign and small arms.

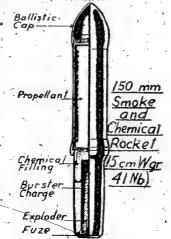
V-Z. Viking, N Y (1954), p 270, these were explosive devices auspended on wires 250 yd long neuchod to wire chutes. They could be dropped from a plane shead of enemy homber formations, thus forming as effective floating barrage. The outto which were not exploded eventually

Small (Generator was a training device committing of a camer 'generate's was a training device communing of a sheer metrit box with a promp on hish The box containing a heating coingonation (such 'set the one committing of Ba petoxice, Ba nitrate, Fe powder and kienelgish) above which was present a chemical wattare agent (CWA) (such as chloracerophenone, Clark II, mustard gas or throphospeno) absorbed on kieselguhr... Reference: E.W.Bateman, ClOS Rept 32-13 (1948).

5-Mine 35) See TM 9-1985-2 (1953), pp. 279-80 and ela-5-Mine 42 under Langminen.

Smake and Chemical Rechet, 130 mm, Spin Stehilland (13 cm Wgr. 4 18th), meanaided in appearance an elemaned. The body consisted of a three-walled area (printed house) preliator grain, surging 1 to three-ded at the bady consisted of a three-walled area (printed house) required grain, surging 1 to three-ded at the base to receive the state of the three-ded at the base to receive the state of the three-ded at the base to receive the state of the proposition of the state o and the outer was of the burster consistent. The weight of such things was about 8 lb and the total weight of the rectar. 79 lb, The anoke composition was ignited after the shall bit the target.

Reference: TM 9-198-72 (1993), pp 243-7.



and Manage Tube, described in TM 9-1985-2 (1953). pp 120-1; consisted of an aluminum cylinder housing in its upper section some reddish-brown smoke composition (giving very bright yellow monke) and in its lower section ignored they container. The cop cover of the cylinder neld the friction ignired, (I second delay) and through a hole in lexition ignited, it second delay) and through a hole in the cupe-happed aliminum piece near the cover potruded, the ends of four strands of quickmatch. These strands were loaned on the side of the smoke communer and more several pieces of firm quickmatch below the molecular and more several pieces of firm quickmatch below the molecular continuer. The anoke continuer was 5° long, 1.75° dispoter and weighed



Smoke Somb, Cylindrical (Nebelcylindriache Bombe, ab-bewinned as NCA: Smoke bombe were usually of conventional approximeter. They were provided with a fuse (usually merchanical), which ignized a smoke producing composition, provided by the convention of the conve

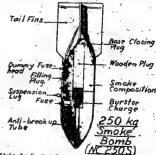
The soutowing types on (1933), pp 30-60, (1933),



body was filled ash at light grey smoke producing product (smelling strongly of campbot), at mechanical product was located in the rear section of the bomb. Took was located in the rear section of the bomb was 100 lb, body diameter 714, body length 10% and over-all include 20% b) HC 50 WC (Smoke Cylindrical 50 kg Marker Bomb)

See under Market, c) NC 50 D/Sec (Smoke Cylindrical 50 kg Floating

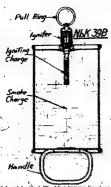
c) was similar in construction to the NC 50 WC. It was filled with a composition giving off a white smoke and was fitted with fuze (AZ 46). The over-all smoke and was tirted with fuze (AZ-46). The orderall weight was about 22 kg.
d) NC 250 5 (Smoke Cylindrical 150 kg) consisted of a steel body (made of reo longitudinal, balves and an about 20 kg. constraints which contained the body control of the control of th



Shahe, Caudle (hebelkerre, Rautherray) is e cylindrical comminer with a compressed pellet emering on burning a described in CLUS Rept 3/4, mobile candler are briefly as Smoke Candle (Npk 3/2), sland described in Fig. 2. The composition of the committee of the c cylinder was a pressed petiet to me smose composition weighing showt [8 kg. This composition, according to LOS Rept 12-1], consisted of Hean (heanchlorement) 59-60, fin dust 19-40 and 18 nitrate 1-2 and the land of the lan was 4 16 21, oz.

was 4 ib 2; oz.

Ever operating the NAK, 39B, the split ring of the lighter was pulled. The friction wire, being oullied pairies was pulled. The friction wire, being authority and the split of the spl



25.5 and house 1.0%. After burning for about 3 neconds, the marke charge our ignized, the marke and gasee generated on frequent of the market through the market through the market through the market through the plant beneath the two holes as the steel top.

Esp lance beneath the two holtes as the steel cop. At large values of dense gray smaller that emission strength expending to CIOS 32-13, for about 3 adaptam or for 47 man, according to DATR 14-04 S. SPB) who in smaller in contractone as the NAK. SPB with the gracepton of the fillings and the method of use. Its saider maximum crosslend of Henn 47.5, Ze dans 47.5 and Ba narrase values of the SPB, beautiful and the section of the SPB with the gracepton of 3.0%, comparison in the form of a cylinder uniphing 1.7 kg and having a beautiful the contract of 100-200 acc.

c) Slow Smoke Candle (NbK L 425) consisted of round, sheet metal container about 480 mm long and found, abert metal combiner about 450 mm (ong and 160 mm of the metal 160 mm of the me

a) fifth percent cales tries to record but contained a different amount composition: Hern 28, K 'chlorate 38, crude sathmorene 33 and kiewlgule 1%, It was 356, trace saturments 22 and stemperature 250 is well breased in three information, total weight 12-13 kg, ignition was effected by means either of a antery fuse igniter or a low tension electric ignier and a grine.
The time of runsaion was 10-16 minutes

9) Spoke Candle (MM S.R. 44) when nerved as a

e) Smoke Candle (BMK SSR, 44) wharh served as a fixed nattent sancke marker, contained of a wheet mend 'rylander, 140 nm long and 91 nm dissector protoded with size 20 nm chamber emances before and lilled with a compressed maxime of Heam 32, 200 days and go young to the marker of the marker o

of emission was 45-75 seconds

D. Black Smuke Candle (NbK Sr) which agreed as a 1) Direct, souther Canodie (1986. 3), which experted as a fixed mixtral smokes merket (consisted of a sheet metal cylinder, 140 mm]ong and 91 see dams, provided, with four 13 mm diameter centration holes and concaming two compressed pellers (tonal weight 1.2 tag) of the applied compagnation: freez 7.5. & thionate 45 sed crede astangence 50%. Same ignition manufacture of the contraction of t

a) Black Smoke Caudia (N&C St) constructed from a) Black Smoke Candid (Pikk 51) constructed from peacehoard 3 and trick; was of the same distraction inferences and state of the same distraction and the same of the same distraction and a two compressed increpenses local weight 1 kg, of two compressed increpenses local weight 1 kg, of two compressed increpenses local weight 1 kg, of two compressed increpenses local weight peace of the same distraction of th

two hased present increments (total weight 600 g) of unitaries; Hear 23, K Chlorott off nod cross evaluations; 132. Time of senses of their mass of the senses of their mass of their ma

Smake Compositions (Rauchnatz), 5make compositions map be subdivided into two types:

1 a) Compositions which on bearing developed a dense where or black another serving for presenting purposes (Nebristoif)

(Nebvisted)

) Compositions which on heating developed a codered smoke (Bentruck), serving for significant perpensive states of the serving for significant perpensive factors, nearly service, nearly service, nearly significant under protectage, smoke projectule, smoke significant under protectage.

According to CIOS. Rep. U-31 (1945), p. 18. overeal

work a companyone were bonk a developed towards the s moke compositions were fiving developed, for saids, the and of the VB II has were assert you take convertine, Swemill compositions were prepared by adding to the maximum of Heris (hearachievershame) and Fr powder raying amounted to Mg, to accelerate the reaction. One is not maintain continued them 55, Fe 5 and Mg 20. They directive damance giring yellow to craige sometic were obtained branch proportions of the composition Heris 45, Fe 50, 50 and proportion of the composition right on, Fig.V<sub>3</sub> 30 800 Mg powder 16. A new mixture designed for much conditions of them 50, 2m dust 40 and 2m0 10%.

Among other mode compositions may be mentioned intension temperations, designated as FM (seed in some

timation termehiorain, desagnated as FM (seed in some smoke hand greateds), a succure of oleum 50 and penna-'20% (used in some projectifes) and a black smoke nature Mg 18.5, herecklorouthme 6.5, maphinaines 12.0 and sandmerne 6.0% (meet the Black Smoke Cartridge).

References: W. D. Bareman, ClOS Rept 32-13 (1945), pp 10-18
21 h.J. Eppig, ClOS Rept 32-36 (1945), pp 2-7 & 17-18
3) hance, TM 9-1987-2 (1953), pp 37, 122, 127-6 & 129-2
4) Anno, TM 9-1987-2 (1953), pp 402, 471, 457 & 196.
(See also References anader Colome Sendge).

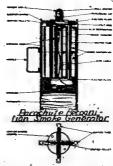
Smokelasa Propolime or Smokelasa Pomber (Reschiose Pulver oder Rauchachwaches Pulver). See Propollant.

Lunka Flore, See ander Flore.

Samble Generater (Base bearvickier)—According to E.W. Baccman, CIOS Refe 52-13 (1947), p 10, all Genman percentage summer by him consisted of a sheet ment consisted with the consisted of a sheet ment on of the verselon's Despert autourers. In these mixtures the reachiques that is a sheet with the consistency of the consistenc no Zn or Fe. The latter metal rms used when smoke of as mader velow color was destreed. All anote common thous

as puntinger-yeurow color was desired. All sancke compositions were agained by means of as igniter, unambly, several masks generators are described in this (German) section under Smoke Castiles. They are called in Gennan Nobelkevaen.

Due of the gracustors, namely, Personiute Recognition Smale Generals in Leachbed to I'M 9-1957-2 (1973), pg 85-20. The device consisted of so also playmen cylinder divided upon the sections one bouring the market producing parts and the other the personium. The first section was subdivided into subsections by three ment places which were divided into subsections by three metal planes which were conacted by review metal distance not, Eight of these rods were equally spaced amount the circumference of the planes while the remaining four were spaced an equal distance from and closer to the centre. The smooth an equal



were fishly held in two users, each with four caniaters. Four 1.4 is holes were drilled in the plates for the igning, tubes. The individual smoke canuaters were simmum taben. The individual mode, cansarse were aimmun orphinden lined with sail wasteproof paper and commung hour sabalate blocks, three of sucks composition and one of a clay-that spideance. The sucks composition consisted of a best sublir blue dye 42 mared with K chlorate 33 and factors 25%. Each of the three mode composition blanks had a small quantity of printing composition (Mark powdst) placed on the loose conductor at the tase before remeats, and in the control of the c pressing to ensure ignition between one block and the next

chitis. The purchase canopy was made of certimons filaness to bicages gaven. Total weight of the generate was 27.9 lbs, overall Leagth 20° had majismo disneter? From the control of the c

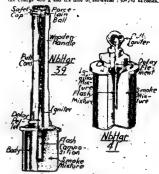
Smoke Grande. See Smoke Hand Grenning and under Pistel Greende and Rille Greende.

Sache Hand Grenade' (Nebelhandgraunte oder Blundkörper) The following types are described in TM 9-1985-2 (1955).

The self-owing system of the property of the p

and overall lengt 14". Duration of smoke ? minutes has used for scorening machine gue nears and pal by the (pp 326-7)

b) Spoke Hand Grennie (1 (NbHgr 41) was nimilar in b) Snoke Hand Genman "II (Warting at) was similar in countries on the Nibig 19, except that it was his persisted, with the mirch (handle). Maximum dismeter 2,1, owersal length 4,1" and obbit weight 10.2. Fam filled with heracellorocchane - Zn dust mixium, Same Large of mixium and used as not be Noblidar 19 (pp. 325-63. Nov: According to Clos Rept 33-13 (1945), p. 31; the com-position of the smoke runture was: Hers (herschin oethane) 53.0, 2n d.as 43.5, and Bn rutate 1.5%. The neight of the charge 400 g and the time of emission 300-250 seconds.



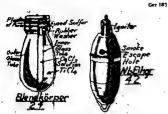
c) Smake Hand Grennde (Blendidepse 14) consisted of a trac drop shaped glass flast (15% dlanerer), powded with a carboard hastle and dilited with 10% on of classics travelled the product of the constant of

6) Smoke thand Grenade (Blenshierper 24) consisted of an outer glass built of guided construction town the containing the state of the containing to go fan acqueous solution of Ca, chlorade which was sented on a nubber washer in the asked of the outer containing. The ensemble in the fact of 100 butter container. Inc ensemone was sealed by a sulfus and coment plug. The concents of the inner tube served to provide the water accussary for the reaction with intrachloride in the formation of heavy emote, The Ca chloride was probably added as an antiference. The granade was operated in the

as an sattragene. The greened was operated in the tase manner and for the same purposes as the Bleed-bidger 14. (p. 18).

1. Egg Type Smoke Cremede (Nhighley 42) consisted of a cylindev-lilipsoudal shaped metallic contribut, 42 for long and 1.7 dissecuter filled with a muck composition. One rad of the body was finitened to permit the smoket one of the public type injuster 2.25c/inAnz. 19

Note: According to ClOS Rept 32-13 (1945), p 13, the composition of the mote stitute in the NbEilagt 42 waste learn (herachlevorthase) 55.0. Za doue 43.5 and Ba nitrate



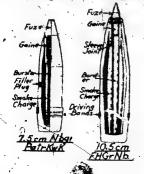
Smake Hand Stynes. See mader Signal Device and also nad a Pyrotechnica.

Smel » Platel Gremenja. See under Pjatel Greande

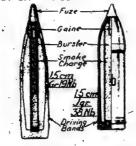
Samba Fusiontile os Shoff Nobespenchoso, Rauchgrannteh Pasjert in combaining a large charge of smeke producing composition and a small charge of humstup explosives Several upon at annih shells were used during WW II by Saveral types at anoth/shells were used during VW II by the Ge main. These shells, or applicates, produced seems Ingenests which were effective against personnel flat used spines objective and a dense smooth or fing which served to pervise the pumber pricedities were used for spowning purposes, so for instance the 50 mm Colored Sandan Morrae Projection.

The % lowing smoke projection are described in TM 9-1985-9 (1953), pp 402-3, 472-3, 496-8, 506-7, 512 and 531-37

4 331-57 pm. Smooth Projectile for the Trank Com [7.5 cm blog-line NewEl year marchinest to the many during an objective NewEl year marchinest to the many during a many large (2 cm of pictic acid) and a large charge of alones, 20 pours, inspergented in 20 p of president comes. Year I weight of shell was 13.0 file (ps. 402-5).



b) 105 ms Sanche Projectile for the Fiels Howlesses 10.5 cm PHOrth) was similar in generication to the previous shell, it contained to the control of the province shell, it contained to the province shell it contained to province the province of the prov is construction to the 15 cm | gr 580h, except that its burning charge consisted of ToT. Total weight not

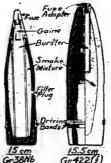


f) 155 nm Smoke Projectile | 15,5 em Gr 422 (f) for the French Heavy Gue 15.5 cm K 420 (f) Little 1916 5t Ch was of conventional design, its mast (busines) take was shorter than in the German designed smoke pro-jectiles and extended to less than the fall, of the length of the shell (p 512)

length of the shell [p 512] p) 30 the Smoke Mortar Project a (8 on why 3891b) for the medium (military) gaggint [8 on wife 34] and conventional is design. Si custed a shifter crimide sacche minure and p PETM/way bursting charge. It weighted '1.25' and was provided with 12 'line is weighted with 12 'line in weighted to the conventional to the conventional conventional

(9 932) and Campud Smoke Morane Projectile (B on Wg. 3800 mm Campud Smoke Morane Projectile (B on Wg. 3800 mm Campud Camp

(1993)
1) 315 mm Antococcete Prosectile (25.3 mm Griba) for the H 190 mm Antococcete Prosectile (25.3 mm Griba) for the H 200 mm Antococcete (11) mm Huffer described (25 mm Fred Hoverteen Senote Steel (10.5 mm Fred Hoverteen Senote S



constaining bemachiere them 55, Zn dust (3.5 and Ba filters 1,5%; The time of emission was 47 minor. Non: According to Hith fallock of Pictainny greensi, all Gennae moute and chemical projections were loaded from the side. This was concary to the American practice of leading projecticies champh on planning.

Scoke Pell Caratish. According to H.J. Epile. CIOS. Rept 32-36 (1945), p. 6, such as span was developed by the Demacke Fyrovechnische Fabrik at Eisenbach/Vatha, but the item is not described.

Sambe Riffe Grennde. See under Rifle Grennde.

Sanko Rocket, See Smoke and Chemical Rocket,

Smoke Shell. See Smoke Projectile.

Sanka Stanul Davice. See under Signal Device.

Smoke Signal, Hand. See under Signal Device and under pyro-

Samble 584ck (Nubelstand), which served as a wind direction indicator, consisted of a sheet sexal tabe, about 100 mm long and 16 mm dismeter, attached to a wooden handle about 50 mm long. En smoote filter consisted of air pellets containing: Increse, K chlorate and An chloride (exact composition is unknown). It was sguited by means of a cup with a friction surface.

Refusace: E. W. Bateman, CIOS Rept 32-13 (1945), p 18-

Smake Tobe (Rauchrohee), was a smoke emitting device consisting of a neuroless drawn cabe, 250 mm long and 25 mm diameter, into which the following compositions mere increased by band:

as Muin layer: hexachloroechane 49, Zn dunt 41. Za

n) Dean sayer: heractionecation e.g., an outside 4 and 164 CN and outside 4 and 164 CN a

Sings Type Igniter (Knickminder). See ander Igniter.

93,613 (1947), Section 0 (See also under Bleiszid). Sealum - Chiertde Explosives or Kitchen Sait Explosives

(1933), 9 277 ].

(Kocheniraprengatorie). German substitute explosives containing large amounts of NaCl (up to 60%). They are described under Emargaprengaroffe,

Sociotol. An explosive containing Na nitrate 55 and TNT 45%. It was autable for loading bombs and shrappel shells. A.Stettbacher, Schiese und Sprengstoffe, Batth, Leipzig

Sedion Azido (Na A ) (Natriumazid). See general section

under Abiden. Na A was used in Germany for the manufacture of lead axide (L. A.), as described in PB Rept.

Sodium Mitrate Explosives (Natriumstratabres excelle), Freplosives commining Na pitrate, such as Sodarol and some?

Sedium Picrore (Natrium Pikrat). See general section under Picrates It was used during WW II-in Germany as a component of GP (Powder), proposed as a substitute for black powder and as a propellant for Panzerfaust. In this composition the picrate was mixed with a binding submance such as laster SS.
Reference: CIOS Rept 25-18 (1945), pp 27-28.

Salid Catalway, See MS-14.

and chlomasted hydrocurbons. A brief description of the methods of preparation of a bout 150 solvents and plasticiness menggiven but no data for the solubility of NC, etc. Some properties of plantics are given in the above reported

Somes . See under Trilloos.

Sonderfreibets# (Special Propelling Material), developed during \*W II by IG Farbeniad, was presumably inseeded for use as fet propulsion but, it contained to the state of the properties of the state o

The mixture finally developed contained divinyl-actives (diletters) 3-6, vinyl actus 6-12, benzing 70, diethylandine 1 and iros carbonyl 10%

Note: The composition does not add to 100%. The large amount of iron curbonyl appears questions ble. Reference: CIOS Report 25-18 (1945), pp 20-21.

Sound Gun . This weapon, constructed by R. Fallauschreck as Appears, was designed to cause taxualties or damage by means of sound waves of great incrusity. It was claimed that at short mage (say 60 m) it could kill a men and at grenzus manges (say 300 m) it could disable him for an appreciable leigth of time. A best description of this device to given by L.E.Simon, German Research to WW IL. viley, h Y (1947), pp 181-2. The wespon consisted of wrasy, N. T. (1947), pp. 181-2. The weapon (consisted of a parabolic reflector, 3.2 meters in issuaders, having an attachment extending to the near of the vertex of the parabola. The attachment consisted of a firing chamber (for producing energy for sound), the length of which was it producting whirty for sound), the length of which was of the wave length of the sound. It is rear, the chamber was provided with two control notation, the outer outsile emitzing methane and the index one emitting output. The frequency of sound was from 800 to 1500 impulses per section and the pressure produced by the sound waves was

Snorted ader Snort . See Schootel.

WEAPON regal to 1000 microbars, when measured at a dismace of 60 meters. The military value of this weapon was slight then to the horst page.

"Some" Guidence System for Missiles, See under Guidence .

Space Explosious with Corbon Duct. See under Krismeri Fabrik Drasmit A -G Pressing of Explosives and Research and Development Work.

Sould Friedwards or Salittina Priming Drang, When shooting in coal manes where coassderable ancomprolled electric currents are to be found, the function in of electric binarias case or detonators have to be rosespected as such mander that they shall not ignore from a pormutal so high an 15 volts. This was achieved at the Troisdarf Fabrik, D A -G by soing special transon functionis in the resistance reason. of 3000 or 50000 uhma.

For preparing such fusebends the tip of the heidpe were was dipped successively rate the following compositions, allowing the material to dry after each dip:

a) let dip composition," which consisted of Ph beforem 43 a. current - magnessum alloy 28.5 g and Al (particle wime '10 to 20 nucroom) 25.5 g emprended in about 70 ml of a 3% sole or NC is sent or burst accourse

b) 2nd dip composition consisted of red lead (particle eine leve than 5 microna) 90 g and ealiston (particle uses 20 to 40 microus) 10 s suspended in a 1% sole of NC in emplor buryl acresse

c) 3rd dip composition was a lacquir consisting of a. 15% sols of NC in 75.25 becyl acrons/ychanol. to which was added Sipolio ADM (methylcyclobexyl sager of 'adiput acid) is the amount of 10% of the dry weight MANC.

The accompe ambility of these femchands in mount atmosphere was not very gold.

Note Soldering of the bridge (fune) were so the send-in weres preparecton of dry angredients for Incehend dipopreparation of hit lacquers and the process of dispuss the fusehend combs are described under Fasehend Manufacture, References. ) 1) 3 1 0 5 Final Rept #33, Jeen 2 (1946), 2 A3/3)

2) PB Rept 95,613 '1947) Section D. -

Specificate Exercise ader Specifischer Druch, desimated as"!". See Specific Energy, or Specific freesure in the personal section

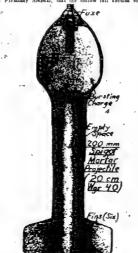
Southfaches Gowiett See Specific Gravity in the gene MT section.

Sportfische Wirme . See Specific frest in the general nec

Spigar Morter (Louiseguester) Projection The following projecules are bacily described in TM 9-1985-3 (1953),pp 314

a) 700 mm Mocuar Projectile, 20 cm War 40 (Wester-granate 40) for use in the right (Intoher) apaget morner 200 cm Radorspawerles) consisted of two sections, one housing about 1" lb of baseing charge (TNT) and the other propellant in three sections each weighing g. Total weight of the round was about 50 lb (p 534) beary apigot morter (38 cm sLadungoworler) was similar in design and there to the 20 nm projective it command 110 b of HE burning charge and was provided with 6 line. Total weight of projectile was about 328 ib (p 535).

Note: There is no indication in the above manual how this projectile was litted and what kind of spigot mortar was used, it is probable, however, according to hist. Bullock of Picationy Amenal, that the hollow incl section of the



proceedile was placed (before firing) over a spigot which was in the form of a short tube. At the base of the tube was married a carriedge case with a propellast and a primer. The living was probably done to a manner similar to that for the Sutton Morest, 1 e by a striker held by a coaled spring and operated by a lanyard.

Salka Bomb. Se- Stackelbombe.

Spiralit (Spiniste) - A class of amokeless propellants prepared, in 1898, by natrating sheets of paper and supremuting them with substances which slow down the rate of burning smodemass). The exact composition of these propellants was never revealed by the manufactures, the Explosivatoil-Werke Spiralit Genellschaft und Max Thorn, Hamburg, The charges were made by superposing and compressing neveral abcets of attented paper.

Reference: | Dearet, Dictionauce, Paris (1902), p 735.

Solitordichte (Denny of Fragments). See Fragments Dennity Test.

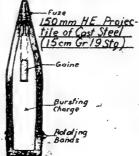
Solitting Process of Menufocture of Sulfuric Acid 12 briefly leacribed under Sulfuric Acid Manufacture.

Secretar Pourder, See Incoloniver.

Spotting Projectific (Schasabeobachtungsgranate). projectile serving for observation and adjustment of artilley live. It contained a small charge of amoke composition in a separate container inserted in the high explosive

The following projectiles are described on pp 409, 494-6, 500, 529 & 533 of TM 9-1985-9, (1953)): B AZ 25mAl (gr. a) 75 man HE Projection (7), cm (gr B AZ 25mAl (gr. a) 75 man HE Projection (7), cm (gr B AZ 25mAl (gr. a) 75 man HE Projection (1953); and 1954 of gaine of the PETN booster (GeZdlg C/98 Np) was located a small charge of smoke composition (on b) 150 am HE Projectile 19 with Gaine 16 (15 cm Ge 19 aZdig 36) for Heavy Field Howitzer 18 (aFH 18).

it contained 11,22 ib of cast TNT as a burning charge and a small amoke charge directly under the booster.



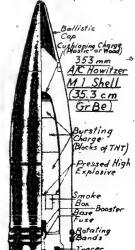
Total weight of projectile was 95.7 lb. Two types of point detonating luxes were used: AZ 23 or DoppZ s/00. The base was provided with a screwed-in plate (np 494-5)

Cer 1.10

et 150 ma HE Projectile al Cast Steel (15 em Gr 19 Stg) for Henry Field Howitzers (sF): 13 and sFH (8) and for Heavy Tustes Howstzer ,still, it was similar in appearance to the previous, projectile, except that it appealance to the previous, protectite, except that is did-not have the activeded hase plate, (pp. 409-60) di 150 cm HE Protectile 19 (15 cm gr 19) for Heavy Feeld Howstrees (sFI) 15 and sFH 18) or for Heavy Turner Howstrees (sHT), it was about 25° long and contained 3-46 ib of TNT its cardboard containers) as a bursting charge. A small charge of smoke com-position was placed on the bottom of the shell. The projectile had a sciewed-in base plate. Two types of projective on the point of detonating fuzes were used; impact and com-bination (AZ 23 and hopp2 s(00) and two types of boosters (Gr2.dlg C/98)p and Gr2dfg C/98) (pp 500-301) is 353 mm Anticoncrete Projectile (35.3 cm GrBe) for Howitzer Mi was conventional in design and contained 75 lb of TNT as a bursting charge and a smell charge of a gmost composition used for spotting purposes. Total weight of loaded projectile was 1265

Its.

Note: According to information supplied by #LH.Bullock and A.B.Schilling of Picatinny Arsenal, it might be assumed that the HE filling consisted of four sections loaded in a cartion, the Lit and 2nd front sections were cast INT. containing 5-10", wax, the 3rd section was cast atraight TNT and the 4th section was pressed TNT (or possibly

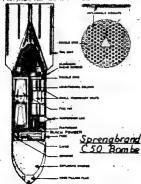


pictic acid). It is presumed that the 4th section acted pione actor, it is presument to does not seem possible as an auxiliary booster, because it does not seem possible that the large mass of cast TNT could have been exploded

that the large mass of cast INI could have been exploded by the small booster (shown on the drawing) which did not extend sufficiently into the busining charge. () 100 ms Mortar Projectile (10 cm Wgr 37) used in 10 cm NbW 35. it contained 3.125 lb of INI as the 10 cm NbW 35. It contained 3.125 ib of TNT as the bursting charge and a small charge of mode componation located underseath the booster (GeZdig C/98Np) and the fuzz (Wg/Z 3b). Total weight of the projectale was 16.0 by 534h.

to true traps of the control of the The applosion of the black powder charge also seemed the alaminum acrows securing the base plate and elected size according elements over a radius of about 100 yards. About I second after expulsion, the delay element is the booster reached the decommon and fired the [NT charge in the cost of the pompe

Total weight of bomb was about 75 lb, overall issuath 42.5°, body length 28.0°, body disnester 8.0°, wall thickness 0.15°, mil jength 16.0° and its width 2.3°.



Sprongelaprengatoffo See Sprengel Explosives in general section.

Sprengeolatine (Blasting Gulatin). According to Stattbacker (Ref 1) the German Sprenggeintme contained: NG 91-93 and collection cotton (N custems 11.8 to 12.4%) 7 m 9%.

According to Beachels (Bet 2) the 93/7 Speningelature had the following properties: temp of explosion 47! . C. vol of gases at NTP 712 l/kg, density of lessing 1.55, specific pressure (f) 1200 kg/cm², velocity of detoanton 7800 m/sec. Trausi was 520 cc and impact sensitivity with 2 kg. weight \$2 cm.

References 1) A.Stettbucher, Sprong and Schienorade, Zarich, (1948),

P #2 2) F.Waichelt, Handbuch der gewerblichen Sprengrechnik, Chiarbold, Halle/Saule, (1953), p 374.

Sprungkanuel (Blasting Cap) - See under Deteratore

Sproughörper - 02 (Spr Ept 02) (Explosive Pastern 1902). A demolition charge weighing 200 g used during WW I for military pinners work. It replaced a similar charge made of pacras soid called Spreaghorper 86 | Colver High Espineives (1918), p 23 ].

Suremphisper 28 (Spe Kps 28) . (Explosive Passure 1928) consusted of TNT on P.A in blocks 2" 19/4" 22/4" wrapped in wax paper or placed in bakelite containers. It was one of the demolition charges of VV IL It was used in' some land muses, an for instance Glasmine 43(f). References

1) U.S. War Dopt Tech Manual FM 5-25 (1945), pp 129-132 2) TM 9-1985-2 (1953), p 275.

Sprengattes in explosive in prepared fam, so distinguished from the generical production of the second seco

84 (Filipalver 88 oder Fo 66) (Explosive Pattern 1885). The name given to peccic scid (P A ) mispeed se a military explosive in 1888.

Sprengemeitten 02 (Fällpulver 02 oder Fp. 02) (Explosive Pattern 1902). The name given to TNY adopted as military explosive in-1902, exploring Speed remailties 6%.

Sprongeter (Explosive River), See armeral section and also the paper of E.R. von Hers, Explosiveroffe, 1954, Heft 3/4, po 29-38.

The Ger Per 796,238 gives the following composition for use in explosive rivers: Al (powder) 65, monaited becanitrate 25 and terracene 10%.

Serensifi edus Nobelis Serensifi, Seme sa Nissoglycuria.

Sprongatrone 02 (Spr Ptr 02), Demolision charge treighing I kg used at the time of WW I for military demolition work. It replaced a similar charge, "Sprengpatrone 88", made of P A Colour, High Explosives (1918), p 21 7.

Sprongriogel, See TM 9-1985-2 (1953), p 264 and also under

Sprongoolpotus (Saltpeter Blasting Explosive). Any blanting explosive containing E and/or No mitteen, Charconl/o CT . 10 0 0000 0

cost and sulfur, such as blasting black powder belongs to the class of Sprengealperer explosives.

Sprongstoff. Generic term for an explosive on distinguished from Spownsmitted .

Sprengzinder, Elektrische (Electric Blasting Cap, literally Electric Decounting Ignater). Two types of such devices her described by Beyling & Drekopf, Sprepartoffe and Zandmittel (1936), pp 222-6.

"5" Pulver (Spandau Powder), A propeilant manufactured before WW | by treating the surface of single-base powder grains with an alcoholic solution of centralite or diphenyl-

aning, This propellant was exported to Turkey. Another had of "5" Pulver was a sporting propellant pelpaced by nicroting nawdest and printing the resulting product.

Beferences P.Pascal, Explosife, coc. Paris (1950), pp 227-228,

Servence Sore Gon. See Note under Tepered Bore Gun. SSP (Sicherheitssprengpulver). A safety explosive which le based on semonion nicrate. Reference: Daniel, Dictionnaire (1902), p 737.

Stabilitär mier Saständigknit (Stability), Logarbassändigknit (Stability in Storage) Stability of explosives and the tests for stability are described in the general section,

Stehnten. See "B" Stubmine and also under Landminen. Stoke. See Stackelbombe.

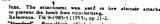
Stacherbanks, observiered as Stake (Spike Bomb), Some German bomis, such as the SC 50, SD 70, SC 250 and SC 500 could be fitted with a spike by attaching is to a threaded lug forged to the some of the bomb jaint above a

Stache

Combe

Stabe

Spike



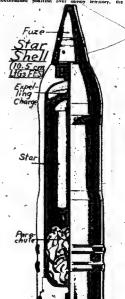
Reference: 18 x 1907 11731, pp 47%.

\*\*Stendord\*\* Propellent, (Einhe inspulver or EP), called

\*\*Unis\*\* Powder by H.H.M.Pike (ClOS Rept 11.68 (1945),
p 6.], was a "S" Putwer (dictartement) difference propellant) which contained 1.4% K attack or 4% hydrocellulose pelland) which contained 1.4% K attage of 37 hydrocaltions and had a caintife value of 710-720 keat/kg. This mixture was introduced in 1944 as the "Service" propellant for all ammunities in order to minimize the differences in ballistics previously usually obtained when propellants. with the same formula were manufactured at different plauts. The incorporation of either K nitrate or of hydroplant ballistics of propellants.

Stenzprobe(Punch Test). See Analyt Section, Brisance Test s.

Ster Shell. One of the projectiles (10.5 cm Louchtgeschoss FES) described in TM 9-1935-3 (1953), p 464, contained a star unit attached to a parachute. Then the shell reached a predetermined position over enemy territory, the time







and Yugoslav .

A later projectile (20) mm) serving the same purpose ... intget puricellis (A) may serving me make purpose but designated the fixer Projectile, is described on pp 519-20 of TM 9-1985-1, its German designation was 20.3 cm Lauchigueness and it was fixed from the Railroad Gon, K(E), (See also under Flare).

Steachpeabe ader Brizanzprobe; (Compression Test., or Brisance Test, Incres also se Crusher Test). Iwo tests of thin kind originated in America and Germany. The first method used the Doringher Betriebe - Stauchungmesser, an apparatus invested in 1879 by Hean, while the second method used the Brisensmeaser nech Kunt, so apparatus invested in 1913 by Knat.

Sock of these methods are described by Stretchicker (Refs 1 and 2) and in the general section under Brisance Decerminations.

References:

1) A.Stetthachet, Schieser and Speciascoffe, Burth, Lespaig (1933), sp 365-368

2) A.Scombacher, Spreng and Schlesscoffe, Ranchet, Zürich (1948), pp 113-115.

Stock and bon Ammunities from a Neutry all of the namiller amounities, items (such as ballets, caps, cartridge cases, such of the per Wall Income were manufactured from softerous mental or alloys according coppet, lead, acided, barse, gliding metal, eco. Due to the some shortage of the above meals which developed at the barse, and a such caps and the conference of the sorie meals which developed at the barse.

WW II. it was noted secretary to repaire. Seem of forces metals such as step of iron.

The following memoralized ritems useds of steel or iron by the Destrict Water and Meautionshirten A-C. Schäftrup bel Lübeck, are described by h.Fepioe et al., CLOS Report 33-20 (1943), pp. 7-23,30-38 & 43-50;

sport 39-20 (1943), pp 7-27,30-36 & 48-50;
d) Smg (Sportsperichous mit Eiszakern) Bullet, cos-nissted of an tron (soft incel) core surrounded by a lend packer surrounded by a stree survelope ninested on the outside (pp 1.7 & 30).
b) Smg. (Inqu.) [Spinzgerchous mit Eisenkern ([engl] 

Assumition c) Sore (Leadless) Bullet, Type Associated of a steel core surrounded by a steel envelope, in this bullet an attempt was made to cushion it (while in the bore) on a film of gas. For this purpose, two slots were unde is the base of the come in order to allow inflow of gases on fixing. The core was also channels and and the envelope had two connectures, one to key it to the core, the other for attaching the castridge case. It was claimed that the barrel life with this buller was

about 5000 round's (p 30) dy Szeel (Leadlers) Bullet, Type B. was a zinc-coared. w/ owes the essents Daties, 17pe B.wes a line-coated, curied single along with the bearing surface considerably reduced in comparison with ordinary bullets. Barrel life with this bullet was claimed to ze shows 3000 rounds, but could be increased by lubricating the bullet (p 10).

Steel Cap manufacture is briefly described by ps 36 7. The cape were sincawd and then intermelly varnished previous to filling them with the following mixture: Ph sephente 40, Ba nitrate 42, Ca silicide 10, Tetracune 3 and Ph peroxide 5% Steel Carridge Cape manufacture in briefly de-

Ger 191 Steel Sleeves Steel Cores Load lackets Steel Bullet's Steel Steeve Steel Steel

scribed on pp 8-16 and 48-50.

(See also under Cantridge Cases, Smel). It should be somed that the Genmans developed be technique of making amounted iron bullets (see under Pulverproperties with sintered iron or steel, described briefly in this wast under Tiefbonder Verfahren.

Stick Granadu. See Rodded Bomb.

Stick Handgrande, See Pocuse Hauber Grennder

Srielbundgrungfe(Stick Hand Greande), See Ponice Manhet

Stockmins, See under Landminen and also on p 277 of TM 9-1985-2 (1953).

Sensit (Scouize): One of the Carbonit-type , explosives manufel about 50 years ago in Germany and admitted to. England. It consisted of NG 68, kieselpahr 20, wood men 4, and K or Be neceste with Mg carbonate 8%. To this could be added some sulfounced oil, or last [ Deniel, Dictionnaire, Paris (1902), p 739 1.

Shorm Matches According to BROS Final Rept 1313 (1947), these matches were manufactured by the Deutschen Zimé-waren Monopole at Limeburg. No descriptions of match

Struckungsmitted ader Struckmittel (Examples, called also Stretcher, Filles or Diluting Agent). In order to combat the shortage of gromatic astrocompound explosives (such se INT), the Germann incorporated some non-explosive secretain which served to increase the bulk of the exploures. The most common of such extraders were

aridizing agents, such as Am, K, or Na nitrates. These anhumaces were not inert as they supplied oxygen to owers defficient promotic nitrocompounds, such he TNT. Other German extenders, auch as Na chloride, being neither oxidizem not combustibles were not as useful, although is wan claimed that mixtures of TNT/NaCl = 50/50 or 40/60 developed considerable and pressure on explosion.

Explosive compositions in which extenders were used were called Emattapresentoife (a v ).

Reference: PB Rept 85,160 (1946), p 7.

"Steambere-Kehl" Guidence System., See under Guidence

Secularized C 500 (Container for Scattering Inconding Bombal, is consisted of a metallic tube, divided along its Bomba). It consisted of a metallist tube, divided along 10 longitudinal sais into two sections welded together, with a princeed maintain as a metallist of the property of the and the primacord. The detonating wave travelled sling-side the seam and caused the separation of the two halves of the complier thus scattering the incending boxes over a target. Thin device did not work very satisfactorily. Reference: TM 9-1985-2 (1953), p 117.

Structurel Explosives (Blast Effect? Explosives), At the time of the development of cockets in Germany (during WV II) the military authorities requested the Krimmel Fabrik, DA-G. to produce high explosive charges which could be used as missiles without being confined in strel canings and thus to save dead weight. It was suggested by the Kristmed Fabrik that material consisting of layers of paper 20 parts. impregnated with 80 pm of moltrn TNT, previously mixed with RDX and NC, be used for the construction of such projectiles. The other suggestion was to combine synthetic projections, and other neglection was so combine symbols one sense (thermolination and thermoenting) with RDX and is one this mixture as the HE for such projectiles (Ref.1). It is so be after that such projectiles produced high

blant offerts (Luftdruckwirkung oder Luftstons), but community ly low shattering effect, called also beisance (Brisner). Proctically the same kind of blast effect was achieved with a HE in bombe constructed by filling a thin, light, metallic case, strong enough to withstand handling and shipping but too; weak to withstand impact with target. These bombs (called in the USA the lish: case bombs) were of very high capacity (about 80%) and caused considerable damage by blast effect alone, especially is maidential acctions. They were fuzed for superquick or amakeles action.

The larger size bombs were called, blockboarers is Great Britain and the U.S.A.

1) O.W.Stickland, PB Rept 925 (1945), Appendix 7 2) T.C.Ohart, Elements of Ammonition, Wiley (1946), p 227.

Statement E. losives A series of explosives passaged at the end of the last century by you Scubeursock of Rautatt. One of his explosives was prepared by blending & chiorses 'mp with 0.5-1.0% of Ca carbonate (or Mg oxide) and with a mixture prepared by treating the hot pulverized charcosi with the (goodron) previously dehydrated and desulfurated. J.Daniel, Dictionnaire des Matières Explosives, Paris (1902), p 795, under Von Stubenresch.

Stormederov (Assault Morae). A sulf-propoiled mosat concluting of a 380 nm sucket projector on PakpéwVI(E) thou also under Panner).

Styphainsaure (Styphaic Acid) . See Trixin.

Submachine Gun er Light Machine Gun. See under Wenpons. The Automatic Pistols (Maschinenpistoles) provided with aboulder attachments may also be called Submachine Guns. Submarine 21. See U-Boat 21.

Submarine, One Man. See U-Bost, One Man.

Submarine, Pocket, See Scebund.

Submarine, Wolter, See U-Boat Valter.

Sulfurie Acid (Schweitinaure), Preparation, properties and uses are given in the general section. The connect method, using a vanadum carelyst, was the most common to Germany, but some plants used the old chamber process and at least one plant used the wet contact process utilizing bydrogen sulfide. The Chemische Düngenabnik A.-G. user the so-called Peterson Tower Process installed by the was the primary material, incomuch se mility was not pientiful during WW II, a special process (Splitting or Cracking Process) which permitted the recovery of sulfur in the form of sulfur trioxide from waate weak sulfuric acids was developed and constructed by Lurgi Co (See under Lurgi Cracking Plant). This new process of manufacture of roleum was used by several Gennan factories but it is doubtful (see Ref. 13) if the process would be economical. in peace time when sulfur is pleatiful. Another sulfur is saving process is briefly described under Sulfur Recovery. The number of German sulfuric acud plants was very great but the following plants, briefly described in various

BIOS Reports may be Considered as typical:

a) A G des Altrabergs für Bergbar- und Zinkhüttenbetrieb, Easen-Bergeborbeck (Chamber and contact

negram, masen-pergenouseer (Chamber and contact process plants) (Ref 7)
b) Bérzellus Merallbütza Cashh, Duisburg-Wanheim (Chamber process plant) (Ref 6)
c) Chemische Dingstrährik, Randabarg (Penrson

(rower process) (Ref 9): Wesseling A-G, Wesseling d) Chemische Fabrik Wesseling A to verseums bei Köle (Chember Process sulfurir seid plant and also a sulfur receiver plant from spent oxides by the method of Dr Jakob) (Ref II) a) Dynamit A G plant at Leverkus en-Schlebusch (Contact process) (Ref 5)

f) Garwerke Frankfurt a/min (Wet contact process from hydrogen sulfide) (Ref 12)

a) IG Farbenindustrie A G, Leverkosen (Contact process (Ref 4)

b) Krimmel-Gestacht Fabrik of DA-G (Content

a) Krimmel-Geestacht Fabrik of DA-G (Connet percens) [Ref 10)
i) Lurgi Chemie A-G, Frankfurt a/Main (Connet process and Lurgi Caching Julic) [Ref 3)
j) Norddeutsche Affinerie, Humburg (Connet process)
(Ref 8)

(Ref 8) References: BIOS Final Reports: 1) 244 (1945), 2) 1623 (1947), 3) 1651 (1948), 4) 1633 (1948); 5) 1654 (1948), 6) 1636 (1948), 7 1639 (1948), 8) 1641 (1948), 9) 1642 (1948), 10) 1643 (1948), 11) 1644 (1948), 12) 1645 (1948), and 13) PB Repr 925 (19475), p 25.

Sulfur Manachieride - Vagetable Oil Dynamites were prepared beginning about 1898, by the Chemiche Fabrik at Winkel on Rhine by mixing NG with tubber-like products obtained on treating vegetable oils (such as lineed oil) with sulfur monochlorade, S.Cl., Other ingredients, such as TNT, P.A., etc. could be incorporated.

Similar explosives were prepared by Birlefeldt. Reference: J. Daniel, Dictionacire, Paris (1902), pp 71 & 134,

Sulfur Recovery from Smoot Iron Oxides. To reduce the shortage of sulfur (so essential for the manufacture of sulfurit acid) the Chemische Fabrik Dr. Jakob, Bed. Kreunisch before WW II; invented a method of recovery of sulfur from the upent oxides which were used for the pudfic season of gases in the Sincher-Tropich Process Plants or it the Gas Works. One such installation was at the Chemische Fabrik, besseling. It was reported that not less than 65 000 tone of saller were recovered annually by this method

Lurgi Cracking Dr jatob's Process was essentially as follows:

a) Four vertical cylindrical racketted extractors, fitted with covers and each containing air mays were loaded with covers and cach containing air mays were looked with spent oxides (7). Does in each years) and extracted with carbon disulfide, at 25 metering each vessel at the 'by' and nowing by spaniny b) Of the 4 extractions, 3 were in the extraction cycle and one off for charging of sinchigring. As a freshly charged extractor was put on the line an extractor containing exhausted oxide, was taken off

containing enhanthed outdo, was taken off.

O The fiesbly changed reasel was first treated with

O The fiesbly changed reasel, was first treated with

the fiesbly changed reasel, which was to a 10 too capacity, waste-heated stull for dis
tilianne, while fresh CS, how the best dust we never

the most enhanted extraction in the spect cuide had

proceeded in the economic limit, the structure was

taken out of the economic limit, the structure was

taken out of the economic multiple contained to the

taken out of the economic duties, and the CS, so contained to

a limit of the economic limit, the structure was

a first reasonal of the last craces of CS, the structure

) After reasonal of the last craces of CS, the structure

| D includitudes of CS, was conducted batchese at

f) Distillation of CS, was conducted batchwise at 80-90 and the CS, was condensed and collected, j) Distillation of CS<sub>2</sub> was conducted batchwise: at 80-90 and the CS<sub>3</sub> was conducted and collected. When distillation was googlete, the temperature in the state of the conductive of the conductive of the conductive of the conductive of the collected populate a large shallow better the copy as the open mig. Yearing; of the still was done with sirrogen of this process is given by Lh. Heyles et al., BIOS Final Rep 1644 (1940), pp 5-10.

See Hochdrockpussee

See Singrydestre.

SV-5mW week Bronneitoff, According to CIOS Rept 10-115 (1945), p. 11, the 507/12 mixture of concentrated nitric-softwise few few special for make mode of collary steep on a white self-temporated in make mode of collary steep cance as geneline, in-liquid stocket propolimets. The relove acid mixture may have as SV-546ff. The same came was applied, se the straight concentrated stric acid (anch as 96-100%) when used is collected. This soil was also known

Symbolic Resins and Empisions used in Germany during WW II for the numericant of inna employed in ammenizion, are briefly described in BIOS Final Reports Nos 1715, 1794 and 1795 (1947).

Tailes. As experimental biliquid socket designed to be fixed in general 63 from a launching machine known to the Debugge. The control of the Debugge. The Debugge of the Debugge. The control of t

References: 1) CIOS Rept 28-56 (1946), pp 24-28 2) TM 9-1985-2 (1953), p 223-

Topored Born Gun (Wargebohrung Geschätz), called alm Gerlich Type Gum, Squage-Bare or Reducing Bare Gua was developed in Germany in the early stages of WW flu-its barrel commissed of 3 sections (starting from the breech): a) Cylindrical section, such as 42 mm bore dismeter

b) Slightly conical middle section and

c) Cylindrical section, such as 28 mm bore disneter.

There were also gians with diameters 28 mm or 75 mm for (a) section and 20 mm or 55 mm for (c) section.

Because of this construction, the projectile which

had a spool-like body, was aqueezed to a smaller diameter as it passed from the breech to the maxule. The idea of this gun was to present a large-cross-sectional area of the projectile to the propellent gazes, and to present a small cross-sectional area to the atmosphere in order to reduce air resistance and thus increase, the muzzle velocity of the projectile. It was claimed that the most valuable advantage of this type of gun was the possibility of reducing the total length of a hore almost to one-half without any changes in maximum pressure and muzzle velocity and preserving almost the same weight, of projectile.

Although this weapon was light and gave comparatively good amor-penetration it was given up for the following \*\*\*\*\*\*\*\*

a) its manufacture was very difficult

b) It wore out too maidly

c) Its effective range was rather short,

Some of the inpered-hore gues and their projectiles are on display at "the Aberdeen Proving Ground Museum.

A chorr description of such runs is siven by: L.E.Simon, German Research in World Was LL. I. Vuley, N Y (1947), p 189.

"Note: According to b.Englenburg, The Ordonness Sergerist, May 1944, p 312, the invector of this gain and its projectile was an American born German segment, H.Gerlich, lesseding in Kiel, He worked on the development of high velocity weapons and projectiles from about 1920, and in 1932 weapons and projective from about 1920, and in 1932 the demonstrated at Aberdeen Frowing Groved, Me stille firing a missile with a velocity of about 4443-16/acc. the Greenan. The first hown combat use of the Gerich Finciple was made in the 3-yaian campaign. The weapon employed in Lybia smar-the 7.28/2.0 Pak, a light national empiryed in Lybia onas-the 2.247.0 Pak, a light anxissalt gas monated on reco-wheeld cavinger, in the gan the gan and the part of the part and a hearty spoom shell of about 20 mm canter emerged from the muzzle of the gam. It was relained that muzzle velocities up to 6000 ft/sec could be achieved and that armor pemetration at 100 yds was 70 mm for hard steel and 76 mm (3\*) for machineshie places.

and 76 nm (3°) for machineaule places.

Near: According to TM 9-1895-3 (1975), p. 360, the Squipper-Rose from consisted of an ordinary rifled gaugit the markle of which was attached a snooph-bore lapsed excession of the consistence of the co

Topored Bere Con Projectile or Garlich Projectile. According to E.Englesburg. Ordnance Sergeant, May 1944, pp 319-13 he typical Gerich projectile such as the Amore-Piercing Projectile Type 41 (Fay 41) used in the 28/20 wm

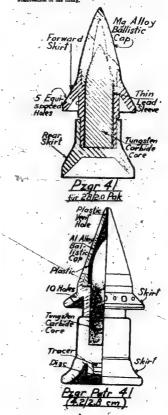
tungates turbide core which had a dinneter who in the calibra of the gun at the muzzle and served

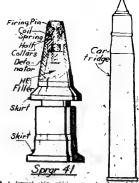
b) A thin lead sleeve which covered the cose and held it in place. The sleeve served as a phoriesat for the core when the skirts were separately from it

on impact on impact on the property of the property of the fired amongsty into the forward skirt and served as the some of the propertie. On impact the Mg alloy produced a finals which permuted observation of the fixing

Nom: The Mg cap was anor used in all supered bore projectiles, as can be seen from the drawing of PagePair 41. this projectile the cap is of aluminum and the tracer

Cer 194





d A forward skir, which was made of a soft sea or gilding metal and served as the bourselst of convenience to projection. The skirt extended as far back as the base of the cyce and was provided with 5 de more equidicant boles. These personations were income equidicant boles. These personations were income except as the skirt was squeezed back and down took the recease in the projectic caining while travelling through the harrel of the gam. As a result; of this vaquezing three diameters of projectic decreased, of this vaquezing three diameters of projectic decreased. Projectiles and to note that the projectile of the projectiles and to note that the projectile of the projectile and the post that the projectile and the project a (skirt) of the Gerlich projectile did not break not detuch.

They simply squessied to the diameter of the punxies of A cear skirt, which was nade of a soft iron or gliding metal (which served as the diving basel (which served as the diving basel (which served as the chiral punch of conventions) projectiles) extended away from the body and was aquested down and back in twelling through

Note: The penetration of the 2,8/2,0 cm Pegs into armor plate was about 3° at a range of about 100 yards and a musale velocity of 4/600 ft Meser. For the 4/2/8 cm Pegs the penetration was 4,32° at 200 yd and a musale velocit 4600-ft/avea, and for the 7,37°, cm Pegs the corresponding values were 6,57°, 500 yd and 3930 ft/ave, in all cases the contract of the 200 ft/avea armonics, sort as 2,2/2,0 Ft/ave, 12/2,8 Ft/avea for the contract of the c Explosure Projective, such as the hyper 41, the norwany part of this shell was flat and, there was not fallistic cap. In place of the tungsten carbide core of Pag 41, the inherior of Spag 41 was filled with a HE (such as Control which was provided with a point demostring func-Tale forward and year skirs were, smaller to those of the Pag 41 and served the same purpose. The faxe of the Sprag 41 was been safe and before firing a single coll spring kept two half-collars squeezed against the firing pin, thus preventing at from being depressed in flight, the centrifugal force created by the rotation of the projectile forced the www.musrcourse apart, and the tiring pin was then free to move nowed the denoancy on "supact. The Speer of was used against presonned and light" material cargets. Note: The above described Amore-Pierce "pospecities had arrowhend design heads and for this reason Graing, classified as Arowhead (Noedle Point) Projecties (v). The advantages and disadvantages of the tapered-hore gam and its projecties are under the projecties of the speed of the projecties of the speed of the projecties are there shows under Tapered Bow.

The projectales used in tapezed bore guas are also described in the following References: 1) R.M.Dennit., Pic Arm Tech Rept 1326 (1944) (42/28 mm

2) A.B.Schilling, Ibid, 1578 (1945) (75/55 mm HE Shell for Tapere | Bore Gun, Pak 41)

3) A.B.Schilling, Ibid, 1579 (1945) (75/55 = AP Shell for Tapered Bore Gun, Pak 41)

4) Dept of the Army Tech Manual, TM 9-1985-3 (1953). pp 371-372: 28/20 mm HE, 28/20 mm, 42-28 mm HE and 47/28 con AP projectiles.

# Terbon, See under Tralons.

(1933), po 301-2.

Torget indicating Flore, Mark 50 Ruskode, and Torget indicator(Red) are described in TM 9-1985-2 (1953), pp 71-3 84-5 (See also under Flore and under Market).

Tuilloising (Increment). See under Cordite Charge Cassage. Tajavisian Guldanea System for Missilas. See under Guidance Systems for Manilus.

Tallerupparete ader Heizhere Machenszhine (Plate Annamens or Heauphle Hining Machine). An apparatus suitable for mixing would and liquid ingredience of explosives, propellants and pyrotechnik compositions. It consisted of a large horizontal, cast 1000, steam-meketed, cylindrical pan on which the materials were placed. These were created and mixed by the combined action of a long, small diameter, horizontal roller (made from a non-specking metal, such as Cu, brass, of Al) rotating around the creater of the base at the rate of ca 3 spm and a series of scrapera (made from non-sparking metal) following behind the toller. The scraped material was reground by the roller and then easin pracraped and this action continued justil all the ingredients were well mixed.

The apparatus was manufid before WW II by the Gobe Burberg, Mertmann, and could be operated either in the cold, or beazed by steam. Reference: Stettbacher, Schiese- und Sprengutoffe, Lainzia.

Tellerate (Dish-like Land Man). Accheding to Simon (Bel 1) these mines gave the Allies considerable trouble throughout WW II. They were sufficiently powerful to put a tank out of action and to wreck almost any other vehicle. The first of such A/T mines, called Tellermine 25, was made of steel, while the models developed towards the end of WW II were made of how-magnetic materials to render mine detectors inclientive. Some of the latest mines were reported to be remote-controlled but it is not known whether they west actually used in combat.

The following models are described in Ref 2: Teller mine 35 A/T (p 267); Tellermine 35 (Strel) A/T. (p 268). Tellermine 42 A/T (p 269) and Tellermine 43, Pilz, A/T (v 2701 (Pils mess mushroom),

Essentially the body of the mine was a circular, flat, disbelike form with a hole in the center of the cures. The body was loaded with 11-12 ib of compressed high explosive (such as INT) and so isniter was acrewed into the cover, A second (floating) cover was held down by a metal ring attached to the body and was supported in the center by a heavy spring. A pressure of 200-400 lbs on the "floating" cover was sufficient to depress it as well as the igniter bosning. The pressure of the bouning on the top of the atriket sheared the pin which held the striker in the cocked position, thus releasing the striker spring. As a result of this the striker set off the percussion can. detonator, booster and the unit charge such as of TNT. References:

1) L.E.Simon, Germa Research in WW II, Wiley, NY (1947), p 188

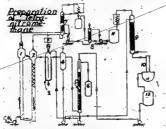
2) Anon, German Explosive Ordnance, Dept of the Army, Tech Manual . TM 9-1983-2, Washington, D.C. (1953), pp 267-70. (See also under Lendausen).

Testing Gallery (Schlagwetterverenchmrecke). See general section, under Galleries, Tenting and also this section

Totan oder X-Staff (Tetranstromethane, abbreviated in this work as TeNM or TeNMe). A demiled description rais work as leave or ferowel, a ownittee one exception of the preparation, properties and anes of I-relike is green in the general section under Methane. The following description concerns the German method of preparation and ages of I-relike. a or I enMe.
As the classical sectod of prepa of TeNMs from scatic

sabydride and nuric soid (see general section) to very expansive, as new, method was developed during WW-M by Dr Schimmedatchinded (Refs. ], & 2). The ishorancy scale procedure was an follows:

procedure was an follows: in an all-glass appearant, achemantically represented on the enclosed drawing, acetylese macrod such attric-acid to give involves and the manusc of aircolous and aircic acid yielded TetMe on bacong with suffurir acid, The sysction was believed to proceed as follows:



CHICH+2hNO. (O\_N)\_C.COOH

=(O\_N)\_CH\_CHO+H\_O (O\_N),CH.CHO+HNO, (O\_N),C.CHO+H\_O (0\_N)\_C.CHO+2HNO \_ (0\_N)\_C.COOH+2NO +H\_0 =(0\_N),CH+CO.

(O,N),CH+HNQ.

= (O\_N)\_C+H\_O

CH: CH+6HNO. =(0\_N)\_C+4H\_0+2NO/\_+CD\_

About 60% of acceptance reacted as above and about 40% underwest complete oxidation according to the equations CHiCH+10HNO\_=2CO\_+10NO\_+6H\_O\_ so that the overall equation could be represented by:  $5C_uH_u + 38HNO_u = 3(O_uN)_dC + 24H_uO + 7CO_u + 26NO_u$ .

The recovery of nitrogen dioxide and of unconverted entric acid was about 96% of theory.

in this procedure the acceptene gas, C. H., was introduced at the lowest point of the system at the rate of 93.5 liters per hour and the nitric strid (98%) containing mercuric nitrate as a catalyst, was fed at the rate of 2.4 liters per

hour. The entalyst was prepared by dissolving 70 g of mercury in about 500 ml of 85° nitric acid, adding 300 bil of water and making up to I liter with 89% nitric acid, and the state of t I wenty ad of this solo was added to every 10 liters of 98% natric acid fed.

By circulating cold water through the cooling coul located in the 2nd leg of the seaction system, a temperature of 30° was maintained. The solution of nitroform in nitric acid overflowed from the circulating system to three nitration vessels (3) placed in series, each accrete being heared by a necess jacket. The sulfacie acid from the TeNNe purific ing there (5) together with the nitroform mixture flowed into the let attrame and the 'estrantrocethaps' and retining acid overflowed from the led nitrator. The tene in each nitrator was maintained at 90 perature in each nitration was maintained at 90° and the

contact time of attration was about 5-hours. Each nitrany was provided with a reflux condenser for returning TeNMe and HNO as well as my condensable gazes such as NO. The wasse memory leaving the 3rd airmory quitkif separated, in (4) and the top layer of TeNMe was ted continuously to the purification tower (5). The feed of continuously to me purification tower (3)), line feed or 95.5% sufficiencied to the purification tower (5) was 1,71 per bour sed the tun-olf product was charged to the furniture (3). Park TeNhe left the top of the purification tower (5) as the man of 440-460 g per bour and was collected in

a tank (GL

The off-gaues of the situation system Pauch as N.O. CO., with smell amounts of HNO. (NO.) a. CH(NO.) A. and possibly coreacted C.H. ) passed to the parification column (7) which was divided into 2 sections. In the lower section the last maces of C.H. were removed by acrubbing with warm nitric acid (containing mercure nitrate) in with warm mittic acid (continuing mercura nature) led as the rate of 1.4 fper hour, in the upper accision of equipment of the continuence of the c uses (7), whereas the CO, was allowed to escape. The abric soid (which constant sulfure soid, airogen

De arene acte (white consiste securing substitutions of the arene force) and arene desirable. When separated from substitution is volume (9) and condensed in tank (11). The custom consisting of 70% subtract acid was concentrated to 55,7% awaysth in the Pauling column (11) and column (12).

Note: Although the attached diagram todicates a continuous Nous Allows in ou auscure classes indicates a continuous system for the expansion and contentation of suzed and from the orparated Tebber, the process was actually conducted backwing, as an afficient material accuminated. Tebber was proposed as a bare for very powerful and things of the continuous contents of the con occupant, exposaves, "chiled in Germany Teresi Sereniques for V, and also as an occupan carrier in liquid socket pre-pellants to replace the committee strong sirrie and but to the fact that the free sing point of Tellies in large high choice 14 Cp, it was proposed by Del Schultheius (about 14° C), it was proposed by Dra Schultheiss and Schimmelochmidt to mix 70 parts of TeNMe with 30 p of new memorance to max 70 parts of TeNMe with 30 p of sireopers terronide. This suitzure had a freezing posts of 27 and was non-corrosive, provided so quoisture was present. It was proposed to use this mixture in V-2 rockets (Ref 2).

1) R.E.Richardson et al, CROS Report 25-18 (1945), pp 6-14
2) W.Hunter: et al. BIOS Final Report 70 (1946), pp 1-4.

Total Sprengstoffe (Termaitromethane Explosives), it was mentioned under Erantsopresigntoffe that, due to the acute : shortage of TNT and of other high explosives, the Germana used during WV II, an ingredients of explosive mixtures.

substances which were not explosives. Among such subatances was TeNMe (terreattromethane), called in Germany Tetan, a liquid waste product of the manufacture of TNT

The first Tetan mixture consisted of very finely pulverzed sluminum (called Pytoschisff), impregnated with TeNMe, and a small amount of the following substances. a hydrocachon rach to hydrogen and a consolidating compound called "K,", which was a nigh dispersion of silies prepared by a special process. The hydrocation was added in order to increase the sensitivity to initiation. This Tetan explosive was a sould possessing a very high blast effect and a comparatively low velocity of detonacion. Explosives with such properties were found to be suitable for inderwater explosions (Ref 1)

Other explosive mixtures consisted of Tetan with liquid or pulverized carbon containing substances, such sydrocarbons, coal, charconi, nitrocompounds, etc. Same of these mixtures were more powerful and brisant than TNT. P.A. PETN or RDX, and were particularly suitable for underwater explosions.

Considerable work on this subject was done by Dr

A.Stertbacher (See general section under Methane). One of the most powbrint and brisant explosives, known is a mixture of Jetsa with toluenc, its yelocity of detonation s about 9300 m/sec. There were also explosives prepared from derivatives. of TeNMs, up for instance the perchiotic exter of trinitroethanol. The trinstreethanol (mp 700) was prepd by con-

densing nitroform (derived from TeNMe) with 40% splution of formaldehyde. Referencen: 1) G. Rómer, PBL Report 85,160 (1945), pp 2-3

2) A.Szentbacher, Schiese und Sprengeraffe, Leipzi (1933), p 185 and Ibid, Spreng and Schieseroffe, Züric (1938), pp 10, 16 & 148.

Tetrocene (Tetrazen) was peepe in Germany utilining the

same conjument as used for prepa of L A and L Ste The procedure was as follows:

a) To a solution containing 4.0 kg of Na nitrite and 1.5 liters of normal acetic acid in 60 liters of waterprehented to 50°, was added gradually and with airagitation 40 liters of an aqueous solution of 5.3 kg of aminoguanidine sulface. The addition took one hour b) After stirring the mixture for an additional hourest and for 1 hour at 20°, the reactor was tipped and the contents caught on a filter cloth made of horse

c) After washing the ppt with several portions of water, it was dried in the same manner as described under lead axide. This gave about 3.0 kg of dry tetracene d) -Boiling the mother liquor for several hours was sufficient to destroy any waste retracene remaining in

A similar method, used at the Fabrik Volfratshausen Chemische Erzeugnisse and at the Stadeln Fabrik, Dynamic A.-G., is described by Sheldon (Ref 3), in this description the following decayls of the method which are worthy of montion are given:
A. A solution of aminogunaidine sulface (5 kg per 40 l

of water) was neutralized (to the litmus paper end point)
with either acetic or nitric acid and then added to a perbeated solution of Na natrice (2.5 kg per 50 l of water). If the addition rate was rapid, small, slow settling caystals Tetracene were produced and if the addition, rate was slow (2 hours), larger and faster settling crystals resulted. B. The detailed procedure was as follows: A temperature of 50 to 35" was maintained throughout the entire reaction period which was allowed to proceed 30 magutes after the last of the aminoguanidine sulfate solution had been added to the reactor. Then the agitator was stopped the product allowed to settle and the mother ligaor removed

by decanation.

After the decantation of the mother liquor, one dilution Comes given and then the precipitate was flushed from the tilted reactive onto a large cloth supported on a natural distinger filter (as for lead anies). After three additional desirance filter (as for lead anies). displacement washes, the cloth was folded over the tecra-ciple and the ensemble placed in a plastic bucket to be

chee and the ensemble placed in a passart control with transferred to the storage area of the dared prior to use, the place of the place of the storage area of the storage and menaferred to the storage ares.

E. The yield of Tetracros when using 4.0 kg of smano-gramations sulface was 2.6 to 2.7 kg.

The following prising mixtures containing Tetracene are listed in Ref 31. Priming Mixture No 30/40, used for riffs and pistol cartridgest Tetracene 3, Pb styphnam 40, Pb allower 42. Ca silicide 10 and Pb dioxide 38.

Terracene was used in initiating mixtures called \$6m. (See also Tetracese in the general section).

Reference 91 1) PB Rest 95,613 (1947), Section R

2) A.Staubacher, Speengr und Schionnwelle, Zürich (1948), pp

3) L.M.Sheldon, CION Report 27-38 (1945), pp 9, 11 &

Tetro-Di-Soin (Teurs-Di-Soit), described in the general nection as Tetramethylammonium Distram, was prepared in Germany by dissolving the Tetra-Salz (see below) in bot 60% nimic acid and allowing the solution to coul. The crystale obtained by filtering were dried in a vacuum. The sait was stable at tomperatures up to 100°. Its mixtures with amountum nitrate and a small amount of RDX were found to be suitable for filling projectiles. (See also general section).

Balwanee

PB Rept 78,271 (1947), p 22,

Tetrohydroforon (Tetrohydroforon) is described in the special section. Temphydroforon and its incomediates were produced during WW II by the Mi Farbenhadusetic at Ladvinghalten. References-CIOS Report 29-12 (1946).

Tetramerir/immentus Dinterere - Same as Texa-Di-Sala.

Tetrameterlammenium Nitrare - Same as Term-Salx.

Yetronothylatroninesuremethylaethone. See in the general pection under T. This compound was suggested as an ingredient of explosives containing R-Sul's but was not found as saciafactory as dimethylerhylenadinitranine Reference: G.Römer, P.St. Rept 85,160 (1946), p 16.

2,4,4,8-Tetranitranine-1,3,5,7,9-partmethylane-1,9-distrate (O\_NO)CH\_N(NO\_) CH\_N(NO\_) CH\_N(NO\_) CH\_N(NO\_) CH\_(ONO\_), crystals, mp 211 . Was obtained during WW II as a by-product of manufacture of RDX naing either the E-Gaix or K-Saix process. Both of theme processes are

described in this German section under Hesogen. The power of terranicraminopentamethylene dinitrate, so judged by

Reference: G.Romer, P.Bl. Reps 85,160 (1946), p 16.

Terrentrocurbanel ader Gelbrecht (Terrentrocurbanele or yellow Flour, abbreviated in this work as YeNCha, Its properties and uses are described in the general section under Curbazole.

general section under Carbazole.

TeNCbx was proposed during WW II in Germany as a substitute for Mack-powder in illuminating flands of the sucket type (Ref 1). Due to the fact that TeNCbx was combigated to completely a substitute of completely type (Ref 1). Due to the fact that I era-Con what observe gre-scopic and non-corrowave it was expected to completely replace the black powder in igniser compositions (Ref 2). According to Ref 2, the Germans, prior to 1943, used black powder as the main ingredient of their pyromechase names powers as me main ingresient of their pyronechaise "intermediate" ignater compositions and it was observed that their storage in contact with magnesium contaming flare or star compositions (such as Mg 20, Bo nigrate 37 and chlorinamed-polymay) chloride 23% remitted in dereportation of the pyrotechnic devices. This was caused by the interaction between the sulfur (of black powder), ningnessum (of the flure or stat) and mouseure (of atmosphere), grving hydrogen sulfide and magnesism outle, On furthe groupe, the hydrogen sulfide; attacked the lead salts fauch is Ph. azide or Ph. styphnate) of the namer than rendering them unserviceable.

To kvoid the destriction in stomes of pyrotochese devices containing magnessum, it was proposed, is 1945, to replace the black powder type "intermediate" composition by the (ollowing mixture: TeNCba. 30, K altoses 40 and A1 powder 1975.

Afr sale of process of the control o

Tetranitramethene (TeNtic). See Tetan oder X-Stoff.

Teirunitrediphenylaminaufen eder Gelbrecht 3 (Teirunitrediphenylamina-sudione Yulf-re Floor 3). See gesentil section under Eder Floor Floor 3). See gesentil section under Eder Eder Floor Floor

Terra Sals (Terra-Salt) is described in the general section under Tetramethylammonium Niconte. This subscance is not an explosive by itself, but it forms powerful explosive compositions when mixed with exidizing names such as nitrates. It was prepd in Germany in the pure state by the interaction of merbyl nitrace with trimethylamine. The mixtures, of Terra-Salt with nitrates were found to be suitable for filling projectiles and for making propellance for cannon, an well as for tockets. References:

1) PB Rept 85,160 (1946) 2) PB Rept 28,271 (1947).

Torre-Sala-Perchloser (Terre-Sale-Perchlosere) . This courpound practically insoluble in water, was obtained by treating TETRA-Salu with perchloric acid. When innited the substance burned with a small bluish-white, sporkling flame. This behavior suggests that it might be useful in pyrostchnic compositions. Reference: PB Rept 78.271 (1947), p 21.7

Terryl (2,4,6-Trinisrophenylmethylnitramine) is described in the general section. Used by the Gemano during WW II as a sub-booster in some protectiles and as a burnting charge in some land mines.

Following is a prief description of the semi-continuous method of manufacture as used at the Troindorf Fabrik. DA-G. The installation consisted of two stainless steel nitrators, peveral stabilizata and one crystallizer.

a) After adding 60 liters of mixed nitric sulfuric acid to the first vessel and smering the agiration, the airration was conducted by continuously adding equal volumes of a sulfusic acid solution of dinitromethylaniline and mixed acid, as above. The temperature was deintained at 40°C

b) The shurry of meryl and acid was ned continuously into the Ind vessel where the temperature was maintained at 25

c) The contracts of the 2nd wenter were two continuously through a standers steel bleeve where crude tetral separated from the spent acid

d) By means of a large amount of water, the crude terryl was tonastened to a series of stabilizers where it was washed, first with water, then with a delute and

sab solution and sense with water e) The moist tetryl was secrystallized from acetone by a special process (very vaguely described) and then doed and acrossed

According to BIOS Final Rept 644 (1945) Tetryl was also used in Euchbach Gasleys Electric Delay Deconston massid at the Trousdoct Fabrik, D. A.-G. References:

1) PB Rept 95,613 (1947), Section S

-72 Sausbachen Spread-word Schares wif v. 1942 .. ap 37-77

"Ther" and "Kerl," Morters were actually heavy, shore berrel howitzers, designed by Krupp Co for the destruction of very arong fortifications. In some ways these weapons resembled the Big Bertin (420 nm = 16.5") gus used during WW L. The Thor and Karl weapons were (umished in two calibers, 540 mm and 610 mm. The 610 mm barrel was 8 calibers long and fired a 4400 lb shell so a distance of seady 4 miles, in order to increase the tapge, the craddle was modified to take a smaller tube. This gave a >40 ram weapon which fired a 3310 lb shall to a distance of about 7½ miles. To increase the mobility of each weapon, it was monated on a modified Pzkpiw IV channis (See also under Panzer).

Reference: G.B. Jamett, "Achtung Panner", The Story of German Tanka in W II, Great Onka, RD I, Aberdeen, Md (1948) Note: According to the "Enemy Var Marchall 1945).

Note: According to the "Enemy Var Marchall Inventory Liss, Supreme Headquatern Allied Expeditionary Force, April 1945, p 133, the weipon dealgasted Karl Mrs or Kerl Gardbans made in two sizes 54 and 61.5 cm.

Thundarit (Thunderite). A permissible explosive manufacture ed at the beginning of this century at the Schlebunch Fabrik D A -G. and introduced into Facinal under the same of Coults. It consisted of Air nitrate 91-95, TNT 3-5, flour 3-5 and moisture 0.5%, Reference:

1.Deniel, Dictionanire des Matières Explosives, Dunod, Peris (1902), p 767.

Tieflander Verfehren (Deep Bonding Process). This term designated a method of deep nurface treatment of nintered metal projectiles developed by Dr V.Duffek and collabocators. The method was claimed to diminish the' went of sun harrels and to increase the effectiveness of armor penetration of these projectiles.

Previous to WW II, the Germans, in some of their apid-fizing guan, used projectiles containing either a lead core or a lead head with a sheath made of cast iron placed with tombuk towal (as alloy of Cu and Za), Beginning about January 1941, when a shortage of lead developed, the German tried to use projectiles made entirely of sistered iron, flowever, the use of these projectiles was not a success because the wear of the born, was so must

that after about 400 rounds the gun became unusable. in order to decrease the friction, an attempt was made to zincare the sintered mod projectiles, but this method did not decrease friction sufficiently to effect a noticeable decrease in the wear of the bore.

Knowing that some crystalline morganic compounds bossess the property of showing decreased friction when subjected to high temperatures, high pressures, or to a certain extent to impact streams, Or Duffek proposed to cover the sintered metal projectiles with such substances. The surface covering was schieved by the phosphacizing process (used in industry to reduce corrospon), which consisted essentially of a treatment of an iton object with an acidic phosphate solution (Parkerizing). As result of this, a thin layer of crystalline iron phosphate was deposited on the surface of the metal.

Although this method of phosphatizing decreased the friction of projectiles in the bore, the amount of phosphate deposited on the surface was so slight as to be removed by cassage of the projectile through the bore. This meant that if the method were to be used for armor-piercing projectiles there would not be enough low-frietton surface material left to improve the penetrations of amor.

The inventigation of Dr Duffek was continued, and on the screage of his suggestions a process was developed by the Metaligenelisthat A -G , Frankfurt a/M (Dr L. Schuster) (Ref 2) which permitted deposition of thinker surface layers of phosphate cryatals due to deeper penetration of the phosphare solutions into sintered iron objects.

This process, called Tiefbonder-Verfahren (Deep Bonding Process), may be conducted by one of three methods described in the patent. The following method was recommended by Dr Duffek:

a) Treat the sintered iron article with vapors of prichloroethylene in order to remove any oil or fat from the pores

b) Transfer the article to a bath containing 8 g of NaOH and 2 g NaNO per liter and maintained at 95° c) After remaining there for exactly one minute, remove the article and, without rinsing, place it in a bath consisting of solutions of Zn phosphare and nitrate (containing 5.4 g Zn, 7 g P O and 6.9 g NO per liter). The bath is maintained at 895

d) After keeping in the bath for 5 minutes, remove the article and rinse it thoroughly under cold water e) -Treat the article for one minute at 95 in a bath containing 5 g of a mixture consisting of 30% Na silicate, 45% NaNO, and 25% NaOH per liter. Thea place it for 40-60 seconds in a bath containing a solution of 0.5 g Na chromers per liver of water and paintained at 95

f) Remove the stitcle and dry it.

It was claimed by Dr Duffek that when almered Iron bullets treated by this method were fired from a piscol (in 1942) there was no noticeable wear of the bore even after 4600 counds. This was considerably better than with the pre-WW II bullets with a lead core.

On the strength of this success, Dr Duffek was allowed by the German war Ministry (near the end of WW II) to develop a new type of AP (armorphereing) projectile, After prolonged investigations, the following method was de-

veloped;
A sintered iron sheath, consisting of line grains of iron on the inside layers and coarse grains on the outside sheath. Fas welded to the surface of an ordinary solid steel projectile. The welding was done by the high-frequency method (Hochfrequenz) developed by the Siemens Co.. Then the surface of the shell was treated by the Deep Bonding Process, an described above.

About 30 projectible caliber 20 mm, and some 37 mm, were prepared by this method and then instead by firing against a 5 cm chick chromiour-nickel states farmor plane placed at a distance of 200 meters. The smalls showed that the average penetrative was about 2/3rd deeper than with an autrovated standard 40 sheet.

References:
1) De V.Defferk, Report to the High Command of the Genman Fortes (Document of the Chemich-technische Reichnessalt, Berlin, and private communication 2) Merallgesellschaft A G, Fenskfurt affs, Ger Put M 131003 V.(18d. Les 26. 19d.

"Tiper" i, H. etc. Nicknames for a surion of beavy tanks. (See motor Peazer).

Tilt Type feniter (Kippulader). See under Ignitet.

Tiresteen Afleys and their methods of manufacture in Germany are described, by L.S. Burch, & R.H.Fayer, PB Rep 100,000 (1948-1949). Some of these alloys water need as components of orderance items.

Treatum Tetrochloride (Titanchlorid), designated as FM is described in the general section. It was used by the General so a smoot producing agent is some hand granules.

(the also make Smoke Hand Granule).

Y-Mine. See mader Landwinson.

TNT - See Trinimecologi, (Trotyl)-

Tolumi (Yolumun) is described in the general section. The manufacture of tolumes in Germany was discussed by W.F. Fanapher and W.A. Hone, U.S Sue Misser laften Circ 7376 (1946). The vasthors interregated Dr. Pier and the sattl of 1 G Farbenladustrie, A G, Ludwigshafee, and Oppos (C A 41, 5134 (1947) ).

Note: According to H. Valter et al., PB. Rept 78,271 (1947), The Germans developed a method for the manufacture of tologue by the interaction of hemicale and method in the presence of phasphotic cold. The method is not denecthed.

The German airmation gards tolurne obtained from the cond tar industry commined 0.7 - 0.8% paraffins, while synthetic tolurns commined about 0.5%.

p.Tolunisofemi) (p-Tulurocoulfamide). See Piertol. It was found to be a numble planticiner for colledion cotton.

p-Tolonisolinolinolinolinylanter (p-Tolonicallunic Acid Ethyl Even). See Mittel AEP-

Teshn. A liquid rocket had developed in Gammay during William, incorrectly leading, according to the control of the control of

According to Ref 3, the so-called Yanke 250 consisted of crade swylidine 37 and nitethylomine 43%, it was used in chipaccine with strong (90-100%) nitric acid (Salbel) services as a source of oxygen.

References:

1) H.Gartmann, Weltsnamfahre No 6, p 134 (1951), Jaco and Auxiliary Rocket Power Pleate, C A 46, 4233 (1952)

2) K.W.Isadand, Development of the Guided Missile,

Philosophical Library, N Y (1952), p 123

Topinion A(Por-Shaped A/T Load mane) - ix is described on p 271 of TM 9-1985-2 (1953). See also under Landmitt's.

Topf Zünder. Pressure type sgniter designed for use with the Topfmane [ TM 9-1983-7 (1953), p 306 [

Torpedo, Ein Man (One Man Torpedo), Ser'U-Boat, One Man.

Testili (Tentitio), Testilien are military explosives constitute of amonium sicity hended with panellia. There mixtures were the contribute and the least sessitive of all the military explosives need, hanned of panellia, waste oils 'ne asphthalean were tried. Seenbacker tried to use. Yould it acceptancetion with themite priming (Thermitidens), but could not pet good seenby. This was due to the fact that only at lower densities, pack as 1,25, did the Testili détonate complessly, while of higher cours, such as 1,5 or 1,6, the detonation was not completen. Starthacker (Ref. 1) gives the following properties for the Testili Constitute S. 4, or for antities.

two founds commany 3.47% or passing:
ved of passe as NTP 971.5 1/kg, heist of explosions as
Cy water vapor 1162 heal/kg and with water liquid
448 kea/kg, many of explosion 3197, specific passsave (f) 12,021, brinance Wafer (B) by Kast 49.7 x 10,
veloc of denot 2500 m/sec at at 1.60.

Note: Definitions of values (8) and (f) are given in the graceal section.

1) A.Sormhacher, Himorellalose 10, 109-10 (1939)

2) A.Stettincher, Spreag- and Schlesstoffe (1948), p 105.

Tor-Kithlung(Drad-Cooling).See general section.

Ter-pressure (Dead-Pressing). See peaces! section

Tétunophon Rision (Killing or Destruction Conflictent). Le in the ability of a unit weight of an explosive so inflict cannotities or to cause destruction he compared with a unit weight of a standard explosive, such as TRT [A.Screpbacher, Sperge ... and Schiesensthis (1948), p. 155].

Trever Compositions (Lauchinpunistics oder Lichinpunistics). Compositions need by the Germane during WI I were described by Langhaus (Ref. I), while some of those need during WI I were described in the book in Isalian by Isaco (Ref. 5) and in some Picutiany Arracal Technical Reports (Refs 2, 3). PB Report 11 344, listed as Ref. 4, is the condensation of some Picutiany Aracal Reports.

The following German 'compositions, used in traces

a) Ignition nizeme: Zr 13, K nizeme 12 and block powder 75%
 b) intermediate mixture: Al 15.1, Ba nizeme 29.5.

K aitmee 12.0, sulfur 6.0 and black powder 37.4% c) Ulaminating mixture (concer): Mg 40.5, No sitesse 54.5 and wax (synchetic, type L) 5.0%

d) ignition survey: Zr 52 and K nitrate 48% e) intermediate mixture: Sn perouide 80 and 41 20% f) illuminating silutore (tracus): Sn nitrate 74 and 41 26%.

The following tracer and tracer igniter compositions manufactured by the Deutsche Waffer and Manifilms fabrikes A.C., "Sheck, are described by H.Peplee et al (Ref.).

g) Day tracer for the 7.92 can ballot Soukli: Mg powder 32.5, Ba nitrate 45.5. Na carbonate (ashudmen) 12.6.

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	36.7	٠	12.7	•	٠		٠	•	٠	,	18.7	•	•	Na photoson 12,9	9 Same as abo
	35.2	٠	٠	٠	39.7	٠	17.0	,	4		10.10	٠	•	, .	Same as abo
	19.1	14.	:	•	7	,	1	* 4	,		2.3	1,	٠		20 mm HZ Si
	18.2	,	53.4			٠	•		,		7	22.2	. •	Almainum .8.2	
	22.8	62.6	í	16.6	•	٠	•	,	٠	¥	٠	٠	•		
	33.9		18.	1	'n		,	10.1	٠	٠	8.2	٠	•	Ba eanlare 29.7	7 Same as abo
	22.0	,	75.0	٠		٠		•		,	3.0	5	7		37 mm APHI
	28.5		30.0	٠	•	•	11.2	,	,	10.3°	•	٠			- Same us abo
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	32.0		36.0	11.0	٠	'n	12.0	,	•		٠	. '		. apixoapia	6.0 Same as abo
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and described one suggest) I was

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and Edwar ress. (phesolieranidebyde base) 10.07.
Mose: The more was reliable to the carbonar was considered and the amount of the first supposed subj. Since meads. The current plays the so 900 meters.

1) Tweer priming composition for the above bullet:

2) Tweet priming composition for the above bullet:

2) powder 15.5 and abellack 40% 5-3, red thead 10.5, Mg. 1) Night tracer for the above bullet: Be percent 53.0, Edward 10.05. Wg. 100.000 47.3, K. quinter 7.5 and Edward 10.05. Wg. 100.000 47.3, K. quinter 7.5 and 100.000 47.3, K. quinter 7.5 and 10.05. Wg. 100.000 47.3, Wg. 100.000 47

Note: The Ba sulfate was used to keep the temperature

down. The tracing length was 600 meters.

j) Tracer priming composition for the above bullet:
Ba peroxide 81.0, Sr peroxide 3.0, Sr oxalate 3.0, Ca

Ba perosade 81.0, Sr pecoxude 3.0, St oxalate 3.0, Ca silected 9.0 and Ersatz revin 4.0%

†) Red tracer for SmkL bullet: Sr nitrate 42.5, St peroxide 17.5, Mg 27.0, Pe lactate 3.8 and pine renin 9.2%

Noon: The weight of the tracer was 0.3 g and the tracing length 500 yds.

1) Green tracet for the above builtet: Mg 25.0, Ba mittate
65.0 and shellac or pune resis 10.0%

our: The weight of the tracer was 0.22 g and the tracing length 500 yde.

m) Red tracer for 20 mm AA mins: Sr nitrate 57, Mg 19, Na cashonate (anhydrous) 8, Sr fluoride 5, Mg stratute I and phenol formaldehyde 10% ely Yellow tracer to 20 mb. AC guns: Ba nistate 57, Mg. 19, Na carbonale (anbydrous) 8, Sr fluoride 5, Mg stenante 1 and phenol formaldebyde 10%

o) Yellow tracer for 20 mm Ar amountition destraine
6.5. apheno'l formaldetyde (10.0, polywiny chipride 1.0,
Ba sierste, 53.0, Mg 24.5 and 5.7 flouride 3.0%
p) ked tracer for 20 mm, Ar amountition is oristen
33.0, Mg 24.5, Ser Suboride 3.0, denatine 6.3, phenol
13.0 kg 24.5, Ser Suboride 3.0, denatine 6.3, phenol
13.0 kg 24.5, Ser Suboride 3.0, denatine 6.3, phenol
13.0 kg 24.5, Ser Suboride 3.0, denatine 6.3, phenol
13.0 kg 24.5, Ser Suboride 3.0, K airiner 7.5
and phenol formaldetyde 1.0.0% Lond without priming
News Could be used in 7.92 mm ammunition. In conjunction
13.0 mm ammunition in conjunction
14.0 kg 24.5 kg 24.5 kg 24.5 kg 24.5 kg 24.5 kg
15.5 priming composition: Ba peroxide 5.62,
15.50 and blanch 16.5 kg 24.5 kg (predex)
15.50 and blanch 16.5 kg 24.5 kg 24.5 kg (predex)
15.50 and blanch 16.5 kg 24.5 kg 24.5 kg 25.5 kg 25. o) Yellow tracer for 20 mm AP ammunition: deutrin

3. Se onulate 4. Ca milicide 9 and phenol formaldehyde 4%. Table 61 gives the composition of tracers and their in siters as determined during WW II at Picationy Amenal-(See following pages).

References: See under Table 61.

Tracer Projection: Many German projectiles were provided with tracers. Following are some tracer projectiles describ-ed in Refu 1 & 2:

387 and 3887 (see Muntation)

39 and 3887 (see Muntation)

30 40 mm HE Proj for AA Gus (Ref. 2, p. 389)

30 42-28 mm AP Proj with Core, for Impered Bote
Gus (Ref. 7, 3.75) (See illustration under Tapered
Bote Gus.)

Bone (mm) 29 47 mm AP, Artorshend Proj with Taugeten Carbide Core (Ref 2, p. 376) 3 mm Artorshend Proj with Taugeten Carbide Core (Ref 2, pp. 377-6) (See illustration under Arrowheed Projectile) 37 77 mm AP Projectiles (Ref 2, pp. 408, 410, 423 m. 474 it 424 il) 76.2 mm Russine Design Projectiles (Ref 2, pp 428, k) 88 mn. AF Projectiles (Ref 2, pp 437, 439-441, 443-4 & 446/8) 1) 105 mm 4P Projectiles (Ref ? un 456, 458-9 & +69) (See allustration )

m) 128 mm AP Projectiles (Ref 2, pp 384-4) a) 150 mm HoC Provider Howstzer (Ref 2, p 487)
e) 194 mm Freech Design HE Provider Railway Gun

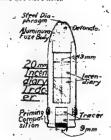
o) 194 mm Frencis Long (Ref 2, p 521)
p) 203 mm HE Proj for Railway Gun (Ref 2, p 521)
p) 240 mm HE Proj for Theodor Bruno Railway Gun

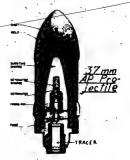
s) 280 mm HE Proj for Railway Gun (Ref 2, p 528); t) 353 mm Anticoncrete Proj for Howiczer MI (Ref 2, p 529).

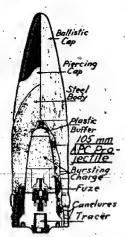
(Screake illustrations under Granate).

Abtreviations: AA Antinierraft; AP Atmor-Pietring; A/T
Antistok; C Capped: NE High Explosive; HoC Hallow charge (shaped charge)

References:
1) H.Peploe et al. CIOS Rept 33-20 (1945)
2) Auon, TM 9-1985-3 (1955).







Trend Dynamite or Guncotton Dynamite. One of the entirest dynamics with an active base. It was prepared by Transi In 1867 by impregnating a mixture of guncomen 25 and charconi 2 pasts, with aimogly ceria 73 p in the persone of 15 p added mointness. It was headled in the moist state, and in this condition it could be decounted with a strong blasting cap. It propagated detonacion completely. A similar explosive called Givenilla was invested in 1267 by the British acionales F.Abel.

References 1) J.Deliel, Diccionanire des Macières Explosives, Dunod, Paris (1902), p 772

2) P.Noone, Nicroglyceria, Villiams and Vilking, Safrinore (1928), p 282,

Translucke Probe (Transl Tent) ader Sietbieckensbereit Probe (Load Block Expansion Test). See Trans Test in the peared section.

Trailwaiver ader Trailmittel, See Propellant.

Tretheatse (Propellent Substitutes). The following 1st anaces, described separately elsewhere, were developed an possible substitutes for black powder and smokeless propellages:

pellasis:

a) Gelbmehl (Tetranitrocarbanoie)
b) Gelbmehl S (Tetranitrodiphenylsulfone)
c) GP (Powder) and
d) Triaitro = N = stylaniline...

Reference: CIOS Report 25- 8 (1945), po 27-28.

Troibaciosologachus Sex Sabat Projectile

Tremenit Sil (Tremonite Sil) Con of the permissible explosives used before and after WW It distroglyceria 33. colled corner 1, meni 12, TNT 2.5, Am nimete 26.5 and Na chloride 35.0%

Reference: E.Barnett, Explosives, N.Y. (1919), p. 139.

Treach Morter Same Explesive of WW I. According to Daivin (1943) p 391, the following composition was used: NGu 50. Am airms 30 and paraffin 20%.

Tri - Abbreviation for Trinitrotoluene (TNT), also called Tropyi.

Trintan oder Tetranel, An underwens explosive consisting of RDX, THT and Al powder, It was similar to Torpez deacribed in the general section. At least four varieties of Trialena are kaoven: Triales 105, Triales 106, Triales 107, and Tripley 107 (Sew Fillers 105, 106, 107 & 109), One of the Trinless, was used for filling the V-2 mocket warheads, (See also under Unterwassersprengsmife).

Yrighest ader Trixings, See Blagginitrosporrings.

Triemylenesly coldinitres o 2 Sec Triglykoldinitres ...

Trigiykoldinitres (Triethylegeslycoldinitraty) (TEGDN), See also in the general section, it was proposed by General Gellwitz for use so a geletminer in cool double-base propellant (G-pulver) destined tos tropical climates, such as Africa, Although TEGDN is much lose volatile than DEGDN is in more volatile than NG (about 1.5 times). It bee good chemical stability and is a good printinizer. im calorific value Q- in 750 kicel/kg, with H O liquid. It in obtained by the nimicion of triethyleneglycol (TEG). a by-product of the manufacture of disthylengelycol (DEG). The highest yield of TEG is below 20%, the most bring DEG. For safety reasons the spent acid must be drowned. which makes the process rather unecommical.

Following in a brief description of the attention as practiced at the Krimmel Pabrik, D A of a

500 he of such TEG (which usually contained none DEG) was run slowly late mixed acid consisting of 70% nitric and 30% sulfurie acids, stiered and maintained az 25 C. After 30 minutes of nitration the mixture was drowned (see Note) in a large volume of cold water. The senumed oil (TEGDN) was washed twice with cold water, core with dilute sode ash solution, sed finally again with water. The yield was 650 kg, or 130% of TEG.

Note: As the mixture obtained on nitration of TEG is extremely unstable it was not allowed to stand to effect the separation of oil (TEGDN) from the spent acid, as in the general peactice with other nimsted glycols, glycerin, etc. Another reason why the mixture was drowned in explained by the high solubility of TEGDN (8 9%) in undiluxed spent acid and comparatively low solubility in to told diluted by water.

Following were the properties of mechanical TECHNI-N =12.1 to 12.2%, vs theoretical 11.67% (see Note below). color-isowaish, de 1.335, theretal ambility-satisfactory (the 82 Kl braz gave 20 minutes), impact sensitivity-could not be exploded by the impact of 2 kg weight.

Note: The high N contract of such TEGON may be due to the presence of ne much as 21% of DEGDN.

'Reference: O.W.Stickland, PB Rept 925 (1945), pp 13 a

Tellans are extremely toxic products discovered before WV II in Switzerland and in Germany during research atedies on insecticides derived from phosphoric axid. Dr Wisth of Berlin studied the toxic properties of these compounds with a view to their military application and recommended some of them to the German Government.

About two hundred toxic denvatives were prepared in Inhornecies of I G Farbenindustrie or Ludwigshafen but only the following three were considered mitable for military applications.

a) Tehen (Trilon 83 or T 83, plso called T 100) was the

mone other actor of dimethylaninecyanophospharic acid,

(CH.) N.P.OC.H It was propd by treating the

dichloride of dimerbylaminophosphoric acid (an irritating agest called Product 39) with Na cyapide, ethanol and chlorobeazene. Technical Tabus was a dark benwa oil with a fighy odor and d 1.077 at 20°, to the pure nmor it was colorless.

Tabus was planned to be used in chemical bombs and rockets, Initially the Tabun used in munitions .. contained 5% chlorobenzene (Tabus A) but, to render this product more stable and to lower its vapor tension, he amount of chlorobenzene was increased to 20% (Yabus S).

North: This compound is called by H.A.Curtis, CIOS Report 28-62 (1945), p 24, Terbub or Trilon 83.

b) Seem (Trilos 46 or T 46, also called T 114) was the menoleapropyl ester of methylfluorephosphoriz acid. o CH

CH P.O-CH . It was prepared either F CH. by the "salt process or by the reassagement process mentioned fait one described by Collogo, Saria was a colorless, odorless

and very volatile liquid about 3 times as toxic as Tabun. Due to the fact that Sarin was more toxic and more resistant to heat than Tabun, it was played to

use it in municious in preference to Tabus. According to McLood (Ref 2) , Sarin was invenued by G.Schrüder, and is called the "perve and". c) Somen (Trilon?) was the monopinucolis 'ester of

methylfluorenhosphorie anid, CH . P-O CH . Is was CICH,)

puepel according to Collomp in a manner similar to

Some's was a colorless liquid having an odor of camphor, it was less volazile than Sarin but even more toric.

Production of Trilons scarted about 1940 in a specially constructed factory at Dybernfurth-an-der Oder, 40 km from Breslau. The factory was never discovered by the Allies and is sow in the hands of the Russians

Referencess 1)Capt Collomp, Revue Manuel de L'Armee de l'All No 37, October, 1949

2) R.D.McLeod, Chem Engrg News 32,8 (1954).

Trimethylaminoexide Nitrote, (CH\_)\_IN:(OH)(O.NO\_). This compound was prepd by Walter et al by treating trimethylsminooxide, (CH ) NO, which is a base with nitric acid. The trimethylaminouxide was prepd by the oxidation of erimethylamine, (CH ) N.

Tramethylaminooxide aitrate proved to be of low thermal stability and was considered unsuitable for use in military explosives. Reference:

H. Walter et al. German Developments in High Explosives. PB Rept 78,271 (1947), p. R.

Trimethylammenium Nitrate, called by the Germans Tri-Sals is described in the general section.

Trinol-One of the names for Trinitronaphthalene.

 $2,4,6\text{-Trinitromine-1},3,5,7\text{-tetromethylene-1},7\text{-dinitrate,}\\ (0\_NO)CH_{g}\text{-MINO}_{g})CH_{g}\text{-N(NO}_{g})CH_{g}\text{-N(NO}_{g}), m.p.$ 155°; was obtained during WWH as a by-product of the manufacture of RDX, using either the E-Salz or the K-Sala process. These processes are described in this

section under Hexogen The power of minimuminous maniethylene dinkente as determined by the Trauxi Test was claimed to be higher than for RDX.

Reference: G. Romer PBL Rept 83,160 (1946), p 16.

Trinitroonisei eder Trisel (Trinitrosaisole) (TNAss). See general section under Anisole. TNAns was used in Germany during W.I as a filler for long range proiectiles (Ferneeschütseranssen) fired against Paris and also in some bombe. . . (See also Dinitroanisol).

Reference: A. Stettbacher, Spreng- und Schleinstoffe, Zürich

Trinitrobenzel (Trinitrobenzene) (TNB). See general section under Benzene. TNB was used in Germany as a military explosive under the name of Filler 70. Reference: Allied and Enemy Explosives, Aberdeen Proving Ground (1946), g 112.

Trinitrochlorbenzel (Trinitrochlorobenzene) (TNCB). Ser general section under Chlorobennens. The compressed TNCB was used by the Germans during WW II under the name of Filler 60 and was cast under the name of Filler 61. TNCB was also used in adminture with Am nitrate under the name of Filter 64.

Reference: Allied and Enemy Explosives, Aberdeen Proving Ground ( 1946), p 113,

Trinitrodichlorobenzal (Trinitrodichlorobenzene) - [TNDCBL See general section under Dichlorobeazene. TNDCB was used in Germany as an explosive and also as an inseccicide.

Reference: PB Rept 1820 (1945), p 10.

Trinitre - N - emylaniline is described in the general section under Ethylandine. It was investigated during WW II as a possible substitute for black powder and smokeless propellants especially for use in moreats and Faustpassone. The development was stopped due to the unfavorable raw material situation (See also under Treibustze). Reference: CIOS Rept 25-18 (1945), p 28,

Trinirementation (Trinirromphthalene) (TNN), and Olatistinaphitalin (Dinirromphthalene) (DNN) were used by the German during W.II is some composite explosives. They were summartured at Semitin Fabrik, Pardahires. Carche-Stowakia. See also general section under Naphitalene.

Trinitrarassecia (Trinitroranorcinol) (TNR), or Styphaic Acid. See Trinin .

TRINITROTOLUOL oder TROTYL (Trinitronolucae) (TRIT) Pelipulars O2 oder Fp O2 (Filler 1902). CH -- C. H. (NO.). 12 in described users fally in the general

nection under Tolumen.

TNT was officially adopted in Germany in 1902 me a military supplicate, earlier than in any other country, its archal use by the Anny was began in 1904, and the jodustrial production started in 1906 at the Schlebusch Pabrik, D A «G.

For the description of German methods of purparation of TNT, an practiced before, during and after WE, I, and the tooks of Escales (Ref. 1) and Senthancher (Ref. 1). The same books give also the properties of TNT.

It is to be soord that before and during WW I the Germann used a rather complicated process for the samufactures of TMT. This was due to the fact that tolksens in those days was rather impres. This method, described by Ess.eloc (Egd I, p. 197) was briefly as follows:

After altracing tolurue by means of weak mixed aisticsulfuric soid to produce MNT (mononitrotolurae), the crede product (mono-oil) was separated from the monospens acid, then washed with water and finally with weak node-ash solution. After blowing live steem through the oil (in order to remove the besizene persons as an imputity as well as any unaissaced solution; i was cooled to allow the publit to crystallish (a a 51.9°C). After separating the p-MNT by filtracipa, the remaining liquid fraction, was subjected to Imerican distillution under vacuum uning a column apparetus. The o-MNT came off first, bearing the se-MNT as' a resides. Only po and middle were used for the perpa of military grade TNT. The m-MNT was used for the peops of liquid DNT-TNT mixture (Drip oil) ineful as an ingredient of commercial explosives. Another method was to distil the o-safeT from the washed mono-nil and then to "bul the residue in order to separate the Point T from model T.

The method of purification of TNT proposed by the Chemische Fubrik Grünnz was described in Gar P 207-170 (1904).

During WW II the German dapacity was as such as 55 million pounds of TNT per month, but the maximum they were produced was 49.5 million in April 1944. The TNT used by the German Army bad a mp of 80.4-80.5.

The measuacture of TNT quring WW II in various Coreans plans; is conceived by Stickhead et al. (Bef 3 and 4) and private Teeribod by Stickhead et al. (Bef 3 and 4) and private Teeribod by Stickhead et al. (Bef 3 and 4) and processes used in Germany was an efficient (Issue the potent of the processes introduced desump WW II into this crossay as Keystone Cothanace Vorke, Mendwille, Promas, by Dt. IA.Gongstoff, and finally adopted by all U.S. Ordanace X Vorke, Mendwille, Promas, by Dt. IA.Gongstoff, and finally adopted by all U.S. Ordanace Johnson Community of the Stickhead of the

In one of the Intgest German plants, the Krümmit Fabrik of D A G, the following batch method was used during WP II:

Al Issuantreation consisted of the following steps:

a) Pre-nitration. The economized acid (consisting of 28%, 1800, 55% H<sub>2</sub>SO<sub>3</sub> and 158M, Glues added to the charge of solume in the Ritentor 2.5 parts of neid to 1 part of tolume. The emperature was maintained at 35400 by cooling coils, and a packet.

b) Post-attretion. The mixture was transferred to a post situator where it remained for several hours at 35-40°. Total time required for a full charge of MNT(5 mas) was 5-6 hours.

c) Separation. The mixture was transferred to a cast from varied where it was allowed to stead for 6 hours. The wasses such (N Q 0.5%, N SQ 0.0% and a small subset of airsts acid) was separated and weat as the acid successy plant while the oil underweat posification.

2) Posification: The crude oil was washed with waster.

val / post tention: The crude oil van wached with wants and justified in the presence of NACH [18 haCH lossed on the robot of the control of the post of the post

The product separated from impactices consumed of 96% o and public and 4% of smilk! The partification procedure took about 2 boars. Tobal time for the preparation of the MMT was 3-14 hours, which was much longer than the present American practice.

B) Signification or Distriction consisted of the following

a) Pre-pirenten. A charge of MNT was mixed with bi-spent soid (previously diluted alightly with water to apparance the gausser part of dissolved. Day is order to use uponey traidual HNO<sub>g</sub> as well as he extract the last succes of DNT.

b) Mirreties. After separation from the dilute soid, the oil was fed into the distract containing the orispent soid, constituting of 6-7% HNO<sub>3</sub>, 3-4% N<sub>2</sub>O<sub>3</sub> and 80% H<sub>2</sub>O<sub>3</sub>, and cooled to 30° During the addition of

the MNT the resperseure cose to 60-65° and then fell to 55° due to the excess of musicated MNT.

c) Pear-aircetten in order to complete the dinitration, 60-70% sitric heid was added to the above mixing and the temperature was subword to rise so 70-72.

Note: Time required for total distingion was not given in order to macretain it the aircration was completed, as a sample of di-oil was maken and dissilled with telescale if any of MPV distilled off, the nitrations was Condition Completed.

d) Supervisor. After allowing the charge to stand ifer 1 hours; the oil was reparated and transferred to an intermediate storage to reason. So the contract of the discussion of the contract of the c

diluted with water in order to separate the greater pass, of the DNT and to obtain an exid containing about 4.3% N<sub>2</sub>O<sub>2</sub>, 0.3% N<sub>1</sub>NO<sub>3</sub> and 73% N<sub>3</sub>O<sub>3</sub>. This diluted acid was mixed with MNT, as was instained sader (a). After this, it was transferred to a storage task where it was allowed to 'emain for 4-5 days before being seat to the nexid accessory-plant, Some

before being sent to the acid necovery plant. Some additional oil separated out during the storage. Note: Distribution in the accovery house of the di-meste, as well as of the mono-weare acids mentioned personally, gave weak mixic acid (50-55% 1000g) and weak sulture (50-70% 19.00g).

C) Telestration in the older Krimmel plant, the acid was added to the oil while in the newer plant the coverse procedure was used which is the current American practice. The new arched was constituted as follows:

a) Minestees. The trinigrator was charged with comined acid (MNO 248, M 20, 783) at a remp of 74-78 and the divoil was added gradually, with agination; while the samp was allowed to rise to 84-55. The reaction was completed by raising the grap to 96 and manifestains it there for about 4 hours.

Total time of circuition was about 6 hours.

) Separation, The agination was anopped and the unitariar allowed to sectle for 15 hours. The trivial concessions readula size(1-2, 8 HNO) and 1-2 HN 150.) was transferred to a washing house and the primport scal was slightly dijuted, with wiszer (in order to precipients out some additional TNT) and this diluted acid was used for the historical Gee above.

Note: Each sitrating house was provided with an individual funant secowary plane. The gasen formed in the circular weet, removed through resultances and forced into absorption towers where they were aprayed with water, thus forming weak nitric acid (50-5%; concentration). This acid was resorted for use in the socionistration.

1) Purification of: TMT contracted of the following.

D) Purification of THT consisted of the following operations:

The strictli (called Schril) was given asyeral water maples as 90° and, has assurable as 80° with birrections as 90° and has assurable as 80° with birrections. The smalled product had a serting point of 180° and the smalled product had a serting point of 180° and the smalled point of 180° and the smalled with as fequal services that the smalled point of 180° and the smalled color of 140° and the smalled color of 140° and the smalled color of 140° and the smalled color of 180° and 180°

washed with water.

Noter The Sellies treatment (removed the incomers of TNT (mostly betw-sad gamme-present on the amount of 4-6.5% extraintreaselesses (TeNhel) present to the amount of 0.2-0.3% and at some time imputitive. Total loss from this orienteed on the second of the second

The purified INT was heated to 83-90°, separated (while in the molten state) from water and then dired in special water-heated versels by bubbling dry hes air (at 85-90°) through the molten mass. The molten full culture sither

directly to a shall-loading pigat or to a flaker. The product with a s p, of 80.5 or higher was called Grade A, that with a isolar—B was easied 6-B There was also a Grade UK (umbristalligient) with a p 80.5-80.4 which was prept by necrystalling Grace A TNT from a water emulsion, orazing the crystalla with a small amount of sealile, rissing with water and drying.

The yield at the Krummel Fabrik was 135-142 parts of

pute TMT per 100 p of MENT, or 200 p TNT from 100 p of toluene.

Capacity of the Krimmel Fabrik was 3,000 metric coas

Capacity of the Krilmond Fabrik was 3,000 metric consper month.

Brooks (Ref 6) and Wenden & Little (Ref 10) describe the following method of manual of TNT at the Allendott, Fabrik of Dynamit A -G:

Semi-Continuous Method consisted of the following:

A) Mononitration (continuous process) was conducted in two stages. Tolures and nitric sold were fed into two pre-nitrature where the mixture was vigorously agitated for % hour at 35°. About 93% of the nitration was accomplished in these vessels. Toluene was fed in at a case of 1,000 ib per hour. The proulting emulaton overflowed into one main nitrator and then to a continuous gravity separator, which was a rectaggular steel box packed with Raschig rings, The mono-waste acid was drawn off through a trapped bottom outlet while the mono-oil went to a washer. Here the oil was washed with water and soda-ash solution and then passed through a series of stripping towers. Live steam was blown through the towers to remove the impurities, such as unnitrated tolores. benzene and parailins. The refined mosb-old was then, sent to the bi-nitrator or shipped to other TNT B) Bi- and Trinitration (batch processes) were too

b) are seen immerses (mace processes see see the USA. As much larger nitrators date used in the USA. As much as '10,000 ib of moronitrosoluses was recated in one barch (about 5 there as much as in the USA.

The bi-nitration took about 3 hours while the tri-nitration required 6 hours. For this reason there were twice as many tri-nitrators as bi-nitrators.

In the trimitrators, the mixed acid (consisting of mixed acid 24, sulfaric acid 76 and water 03) was added to the crude DNT (hold) while maintaining the temperature as 83°. Then the temperature was taked over reported of 20 minutes so 98° and maintained a thins point for 2 hours.

Note: There were no bottom outlets in the nitrapora, permitting the drywning of the charge, but is case at fire there was a quick-opening walve which permitted a large acreum-00 50% auffuric acid to apray into the nitrative to extinguish the fire (Ref 6, no 9-10).

C) Portification of TWT for Alianded). Trivall was washed with bot water, and then crystallized from fresh bot water, and then crystallized from fresh bot water. After drawing off the water and real-surying the product, it was treated with a 10% solar of Na sulfits was from 3 to 4 ho 10 as sulfits per such 100 lb of TRT. When the 14% solar was mixed with the TRT surry, there was, sufficient water peacest to bring the strength of sola to about 3% of Na sulfits. The sed waser was filtered off leaving a TRT with secting point 79,3 to 80° For a purer product (a peace 10 to 10 to

by measures with hot water and then treated while? in the molten state with a fresh dilum solution of sellice, uning a secular 1 ib Ma, SO, per 100 ib TNT.

The resulting red water was deceased and the molton THT, mached rates with hot water. Then the hot wash water was passed through 6 caoling mim so secures the INT which was dissolved in the hos

solution and descipinated on cooling (Refs 6 & 10).

Here: The Allerdorf plant command 102 is of nitric sense. por 100 lb of TNT (no against 98 to 100 lb in the U S A ). and 195-200 lb of clean (against 215 lb m the USA). The yield of \$0.4 -50.5 ThT was 200 lb per 100 lb of saluene (egninar 205-206 in the USA). Com of 1 ib of TNT was 0.553 much (obout 13 d) (Rud 6, so 11-15). which was comparable to the price in the U.S.A.

D) THT Weste Veter Treetment, in secler to olim the expense of eveneration of pasts TNT wester, a special method was developed in Garmany (on the inhessemy acute) for trenting such waters in the cald. This method permitted the money of some nitrobadios (Ref & pp 27-28), la rhie pracque the pit of weste water was adjusted to 5 by addiso some solfacie soid. This was in order to face the organic acids so that thry rould be assected by a solvens nalled Phasenal-way (presumably in mixture of buryl and looked sentated made by I G Forten managers. After appearing the naivent (commissing the expressed mercial) from mean by contributing, the polyour was distilled off. The nitrobedy obstaced an the postdue to the still was insended for use in commercial explanives. The repursed want want was meaning with him to helps the all to 7 and then many distilled he order to recover the discovery Phononculoss, This left a pollers colored waste want from which 932 of the ajmobation had been removed. It consider some inorganic impurities which were assumed to disched (Red & p 27).

Continuous Vapor Hitration of MHT to THT true devalue. ed by Dr A. Wille, and a piles pleas you built at Alleads (Red 6, p 25). The plant openings or the may of 10 the of TMT to how or I metric tons a neath, it constant at four major majors to) an associant chamber for MST, b) a server for pleastion, c) a perfect condenses and d) a hoperature

The summer chamber had use agray hearle for the 1807 feed (which was Justician to 100) and a Jud a carrie to introduce almogan gas (which was probusted to 160°) The moulting mist (vapor) of MIT in miscoom was comducted from the structure chamber to the hosten of the witnessing tower, 200 mm insude dister and 2.5 m high, note of sminless used and provided with a sminles. sevel spiral coil for cooling. The mixed soid, conce 30-33% nimic acid, was also inmoduced into the bottom of the arear and it flowed appeared with the MIT and niveyen. The temperature of the mineral in the newer was animalised at 92° and the current of nitrogen and servided sufficient nationing.

The acid and nitrobady mirrors overflowed at the top of the sever into a regionspiler stainless sored has separator, where the TNT settled to the bottom. The weeze acid contained 15% total nitric scirl and less ninese than with the latch process. The ninesem pass together with nicrogen suiden, and organic repers (so as remainstanchase) was led from the source to a ruffus conductor which returned the condensate to the bospen

of the tower (Ref 4 29). Monufacture of THT at Schial Serch Present (Ref 6, p 19). The INT plant at Schlebusch was built in 1906 - the first plant for manufacture of THE on se industrial scale.

The INT plane and during NW R was constructed in 1935 and constituted of one line with rout housest hir, trin, reliaing and drying. No monphiracion was done because the MNT was received from 1 G Estimiodization. in mak care. In the bi-busine parches of MNT up to 3500 bg wary airmand to DNT and the cycle was 5 hours, in the wate attended to JOLI state the cycle was 3 nowms, as use tribonate such batch of DNF was 4500 to 4600 hg (abbeit 10,000 hb). The unsticest production of one line was 2500 metric tomer/mostly subject 5.5 million lib.

Cantinuous Hitenticaph.dBT to TRIT or the Salebands Publish, D. A. - 10,8700 hB 27 producing in kindly de-

ecribed in Ref 10. The plant was Command River on sting of hostilities and chipped to England where if dever been assembled.

Now: A similar plant in new in exercise in Helland Class Dutch Section).

Continuous Manties of IMT on THY on the Labor. bunch Pubeth, DA-Gillarhed at Danmailly, Dr Dagetelf and callaborators developed and built during WW II a consider uses pilot plant parenting 500 metric toos per month of THE. The equipment consisted of size mannin placed in a row and connected in seriest. In the first venual, called the diluser, the bi-warm need, (amining from the 5th meson) was diluted with water. The diluted acid was transferred to the 2nd toront, nailed the extractor, in which the nitrobodies disselved in acry were extracted with MMT (delivered from one of the IG Farbentadustric plants). From those the MMT with unmound alterelation was transferred to the 3rd vessel, the ornerson. From the reputers the nil overflowed so the 4th reseal, the bi-nitrane, commining some triupant acid which was pumped from the ini-nitrane (the 6th reseal). This seld was funified with pune 60% ninic acid. The mixture of biroil (DHT) and of hi-wants acid was manufacted to the 5th percel, the separator, and from them the sold was to the diluser (let vessel) while the bi-oil west to the trinitenest (6th rensel) which contained the mixed acid pumped from the 9th resnel (serving as a separate for, the tele wested, called the pounitrantel. The arest amp was aspecation of the trivall (crude THT) from the trivenest acid and this was done in the 7th second. Then the acid was punced so the 4th tested (the bi-simular) while the trivail went to the permitteen (Sch venewil) which collesied fresh strong mixed acid. Then the mixties was pumped in the 9th vessel, the represent, and from these the sertially used mixed acid west to the mi-niconer (6th versel) while the TNT west to the wash-house. The nitames were cylindrical veneria, 2 ft inside diam and 3 fe deep previded with colla and agitators. The represents were of the cyclose type, the upper cylindrical part was 3 ft id and 2 ft high, and the beaton coulcul part I is deep. The aircasons had a capacity of 200 km bi-oil and the required amount of said. The said consume tion for his and tri-nitracipus was about the same as for the batch process, namely \$7 lbs nimic and 195 lbs steam for 100 the TNT produced (Ref 6, p 31).

Continues Method of Refining of TNT, developed on a pilor scale by Dr Demonif of Dynamic A -G and mind at Schlebnock, used size vessely consected in paries. The lax, 3rd, 5th and 7th weineln were 'sradown, the 2nd. 4th. 6th and 5th respels were separators and the

9th vessel was a dryer. The crude moites TNT (called Robert) was transferred from the nineting plant to the lot vennel, where it was agreeted with hot water. The liquid mixture was transferred to the lad vessel (cyclorie tree separator, nameles to the once used in the naturation plant), where the oil was esparanted from wante acidic water. Theor the oil was treasured to the 3rd vessel whose as upo washed, while soils in the molesn state, with a hot diluter solution of sodium sulfing (Sellim) at a pld 5 to 6. After this the trival was repersued from wanter water (4th wastel) and then washed with fresh hor warm (5th verseel). This waste water, was separated in the 6th vessel and then in the 7th vessel the TNT was washed again with water for the less time. After

depreciate the late wath water to the compressed of the compressed of the through the latest through through the latest through through the latest through through the latest through the latest through the latest through through the latest th was flaked in the usual maries (Ref 6, p 32).

Continuous Marked of Washing of THT designed by 1.Meianner (Ger P 732,742, 1940-1943). The apparatual consisted of nin vertical tail cylinders (columns) prowided with performed places. Each column was encioned in a steam jacketted feetle so that the TNT could be keps molton throughout the weahing process. After separating the emde liquid TNT from the bulk of speas seid, was emploified by means of live sman and pur-beared eir. The THT emulsion entered continuously risto the beeron of the let column and simulmneously some hor wager, required for rineing our the residual acid, was sected. The business moved upwards and, other passing through the performed places (installed in order to achieve anidany bda THT, add neserted warrain samital most medium), reached the upper part of the column where the neparator was located.

After reparating the acidic water, the liquid TAT went an the bettom of the Ind column. The process was repeated on in the lot column except that a 5% Na bienthouse solution was used in the washing medium.

In the jed column, the TNT emulsion was weather with hor water, and in the 4th and 5th column it was or washed with a 3% Na suifite solution in order to country The time and greens isomers of TNT. In the 6th column, the THT was weeked with hot water, ab in the 'lat and ini columns.

it was claimed that the process possessed the following advantages over the burch processes

a) Less time consumption due to the fact that much more intimute couract was abpained between the emulaified droptics of TNT and the trashing media then two possible with the older method

b) Better yields - 99-96% ve 90-93% with the ulder batch methods. This was claimed to be due to the fact that as acoust contact between the TMT droplers and weeking media in very abort (lean than 5 minutes in each column) their was practically as decomposition or removal of the alpha TNT and only the imparities were affected

c) Better quality of products sesting point \$0.5-80.70 vs 80.3-80.5 °C by the older unthed

d) Genter sconomy . man power requirements were

THT Refining by Mittie Acid. During WW IL the | Meinener Co developed a reflaing process with the sam of receivering the ThiT impurities for met in commercial explosives. in this process, the crude TNT was crystallized from hat nitric sold of searly 100% concentration. The manutneruitne took place in Belgium but was discontinued because of a sectious explosion. This was due to the fact that solutions of TNT in strong natic acid are very sensitive liquids known as Sprengel Type Explosives. After this accident Dr A. Wille of Allendorf modified the process to make it non-taxardous.

a) in the sew process the crude TNT was dissolved in hor, weak (about 60%) natric acid and the solution cooled to coom temperature. The crystals of purified TNT were separated by filtration from the told mother liquor which contained most of the impurities and isquor which contained most or the imputities and some sight-TNT. The INT crystalls were washed directly on the fixer was fresh 60%; cold shout he could be as a saw of the cold season with the cold was as award to be used that a saw of the cold should be a saw of the cold should be as a saw of the cold should

b) The washed crystals of purified TNT were melted and the molten compound washed with hot water. The resulting acrdic water was removed and saved mor he used later for absorption tower fred in the acid. recovery plant. The moiten TNI was further washed 2.3 times with fresh portions of hot water (saving the waste water each time), dried with hot air and then finked in the usual manner c) The first 60% nitric said filtrate (see operation a)

was distilled in a stone-lined plastic still using induction beating to eliminate basards. The average strength of the recovered acid was about 30%.

The purified TNT was of light color and had a s p (setting point) 80.2 to 80.3, it was claimed to be less studeful than TNT s of a p ab high, as 50.6 obtained by the Na sullita purification. This could be due to the fact that nitric seid removes among other impurities the DNT, while Na suifare does not. For some unknown season, the TNT refined by nitric acid could not be pellered. The loss of crude TNT on refining was around 8% (about the same as in suffice refining) but the nimb bodies recovered from the nitrie seid could be used in commercial explosives, while in the Na sulfite process the nitrotodies were decomposed (Ref 6, p 27). Leading of Assessition with TNT:

All bombs and shells were cast-loaded and the method in describere in Ref 2; pp 14-15, 18-24. Items such to deconators and some boosters were press-loaded and the procedure is described in detail in Ref 5, pp 46-48. "Bass of THT in Germany During WW III

A) Straight cont THT was used lot a) HE shells, such as the 37 mm, 47 mm, 50 mm (treach moreas), 75 mm, 75mm (smoke) and 105mm (howitzer) b) AP shells, such as 75 mm, 75 mm (capped), 47 mm (round nose) c) Land mines such as the Tellersine

B) Straight pressed THT was used in some deronators and boosters. For instance, the booster for the 47 am HE shell contained 3 pressed pellets of TMT, density 1.49, consedewich was (Ref 5)

C) THT deconsitiond with wan, A small quantity was tued by the Germans as early as WW I in their AP shells, At the Barrie of Judand, many British ships were much by German AP shells filled with desensitized TNT, which exploded after penetrating through armor, while most of the German ships were undemaged, because British AP shells were filled with P A which exploded on the surface of the armor before penetration. This was due to

the fact that P A is too sensitive to impact. . During WW II, the Germans used some AP and SAP abella filled with blocks consisting of mixture of THT

with 3 to 20% of Montan way. The Mighan was constant was in the asse where the shack of impact is once integer. The mil because consisted of semight compressed THT.

Following are the senses of TAT-was mintmen used

Fredering Ave your sames or INI-war maximes asset for leading shelder Eithers No 10, No 11, No 12, No 27, No 29, No 30 and No 100 (See under Fillers). Noszi All the allors mentioned mixturess, with the possible exception of Fillers No 29, were less powerful and brinant then straight ThiT, and their velocities of descention ware lower (Ref 4).

D) Mintres of TRT with vertice emploature. Is some mixturers, such an with RDX or PSTN, the TNT was incremented so units the composition examines and less expension to make one composition chamble and less nearlists to mechanical action than if RDX or PRIM was used alone, aloneigh the addition of TRY resulted in the lessening of power, brisages and velocity of decom-tion of the RDX or PRIM.

in another group of explosives, the TNT mes the principal high explosive component, the other importances being soided to exercis the available supply of TNT. heing soled to accept the available paper of this .

Annual three immediates were An alexan fruch so in discass of the Articles of the Annual and Associated I. E. so. No. alexante (such as in Soles), DNB, DNB, DNB, TKE, DNA, Co sitrate, common sale, one. These explosigife can be cleased as Emacoareconstelle (Chipe

One duck mixture, samely THT & DNA, was used in some hand greenden, become it was presumed that in-companion of a companiously weak explosive, such as DRA prevented the fermation of excessively small frage

These was also neveral TNT & TNX sixtness and they are described under Triniscopylel.

Abbertindenn AP Anmospierchag A/T Anzimak; Co Calcium, D A 40 Drumni Abricaponilichent DNA Di-terentialer, DNA Districturance, DNN Districturantialer, DNA Districturantialer, Godf German Patent HE filigh Ex-plority; in some MNT becombing to a mining plenty, in some MNT becombing to a pro-posity, PNA Districturantialer, ENA Cyclosius or REEL MAP Sund-manufacturi, TOMA Cyclosius or REEL MAP Sund-manufacturi, TOMA Cyclosius arches, TNY Tininanciane; TNX Tininanylens.

1) R.Escales, Minespungemilie, Velic, Leipnig (1915) pp 142-161, 290-128, and 436-438

2) A.Srottbecher, Schioger and Spentageoffer, Roots, Labour. (1955), pp 361 - 277 3) O.V.Stickland or al, General Summary of Explaning

Places (Germany), PS Rept 925 (1945), be 6, 31-38 & 46-48

6) O.W.Seicklood at hi, Survey of Garmon Practice and Experience in Filling Nich Syntacione, PS Sere 1820 (1945), so 6-8, 14-15 & 18 5) Anon, Date on Fourige Explonives, PB Rept 11,544

(1945), Port II. Tablas I & II 6) C.H. Breeks, THT Mandacture in Germany, PR Bost

22,930 (1945)

7) Allied & Higmy Explosives, Abardoon Proving Ground, Marriand (1946), P. 79 9) H. Vulear et al., Gazman Development of High Emploaires.

PB Ropt 78,271 or FIAT Final Ropt 1055 (1947) . p 2 9) A.Stotchacher Sprong und Schiesusselle, Rascher, Elle (1949), pp 73-75

10) J.C.H.Vendru & J.R.Linde, Report Frederica of THT, U.S. SANS, Co. Landson Unit, Jolies Assessed Lands (1925)

Trinitearried (Trinitearriese) (TNX) is described in the general section under Xylene. The German TNX people by nitrating commercial system was a plantic product courg about 85% of criairre - a - spince of mp 162. See rear being a liquid mixture of mirotodo and p-nylence. (Rafe | ar 4).

In order to screech the available supply of THT, the German during WV II used some explosive compositions which contamed so high an 45% TNY.

Following are some examples of such explosives:
a) Missures of TNX 20-25 and TNT 80-75% with a mp average of about 770 west used for castleading nome bambs and shalls. For their manuf releas and tolures were nicrosed separately by contimeous methods to four MNX and MNY and the mixture ad the two associatescompounds in the appreximate sails of 1:4 was nicessed directly to the trinitus sums, but the pullier reflaing was unimed (Refs.

b) A mixture of TNX 43, negrel 50 and TNT 5% with n mp about 80° and quantile for case-loading shalls, esc, was peopl by nitration of a mixture of MIX and distracetylexities ead incorporates in the stepling trinitesand product of 5% of TNT. The mirrors was more because then TNT but required a stronger becomes

(Raf 2, p 11). (See also under Erkernsprengemille).

References

1) A.Smithicher, Schlean und Spongeroffe, Lefpuig (1953) pp 277-8 2) PB Rest 1820 (1945), p 11

1) PB Ress 27,930 (1945), p 15

4) A.Stonbicher, Spreng und Schippenffe, Zürlen (1948).

Tot-Sells . See Trimethylamostian Nitroco in the peneral

Tringitud, See Filler No 108(?) under Fillers.

Tel-Teland. An employing consisting of 2 page of Tri (TNT) with 1 as 2 pasts of Triant (TNN) used during WW I for filling tome small caliber shells. Compress PIA, was used as a booster.

References T.L.Davis, Chamistry of Powder and Explosives. Wiley, N Y (1943), n 158.

Tetwantphalts St. An explosive used in greath mining. In was people by WASA-G by crushing and grinding the double-base peoplemen left no abeplus after WW I. References : Naoine, Histoglycusin,Baltrinois (1978) p 499.

Yelaha, Triefe, Trimitrorosurein, Styphotosium adm Ompethrinedero (Trinitrorenorsinol de Styphnie neid) in described in the 'process section under Resoccased, A short description of Trixin is given by Surnbacker (Ref. l oud 3). A northed of Porps of the Thins to proceeding the process of the Thins to proceed in Germany during VV II in given in Ref. 1. Tritials we use of participated in the process of the process of

(1953), p 287 2) PB Rest 95.613 (1947), Section M.

3) A.Stettbucher, Sprang- and Schlausmeite, Zügich (1948).

Triniref, Trininet, Tricinet, Biet Trininet oder filei Strohest . See Blei Trinitroresoncinat and also in the general section under Styphnic Acid.

8. 200 . 2

Trivings and Torreson Eugets Same on Singaydants

Trobuch Priming Mixture, passated in 1890, communed Be picrace 70, K chlorare 15 and 15% of a double sait pered in the following manner:

Pyriding was added allowly to a note of a metallic mitrace (such as of Cu. Ni or Bi), until the characteries sic odes of pyridine became systems. The resulting crysthis were dried and incorporated in the above mixture. Reference: Daniel, Dictionaste, Paris (1902), p 776.

Tepladorf Fabrik D A -G was one of the principal German factonies for the manufactors of prusing and initiating amplicatives and devices. Its WP III developments and activities are briefly described by W.Taylor et al, BIOS Final Report 644(1945).

Teelts. Plastic emercial consisting of either polystyrene or polystyrene coplymers manufid during and after WV II by the Dysamic A G., Troisdorf; Ber Kola. Some fuxe bedies, such us "EgtZ. I" were made from Trolirul. References.

References: 19 V. Krasakch, Kunstatoffe im technischen Korrosionsachuta, Lehman, Minchen-Bertim, (1943), p 427-19. \*\*A. Scholling v V. Zentoweld, Kunstoff-Taschenbuch, Henset, Minchen (1952), pp 240-241, 279
) b. A.T. juche and R. V. Kutchkudi, Picatinny Arsenal,

Dovet N J; private communication (1955),

Trepfil oder Plüssige Let (Drip Oil or Liquid Oil) is described in the general section and also in A.Stettbacher, Schiege- und Sprengatoffe (1955), p 261,

TSMV 1-101 See Schicoswalle IS.

T-Smill (T-Sculf or T-Substance) . is the German designation for concentrated hydrogen beroxide (Wasserstoff) percevel). T-Smif was a clear, viacous liquid contr 80-83% M O and 20-15% m O. It was fairly stable at ordinary temperature and pressure when in the presence of small quancities of apphilizers auch as phosphoric acid. However, destine the erestreet care, it was not consible to prevent a slow decomposition of the H O late oxygen and water over a long period of time.

T-Smif was heat stored in aluminum receptacion which had been previously treated with an acid and trisodium phosphane, it can also be kept in glass vessels, but he any case extreme care must be taken to exclude any dust (inorganic or organic) or any other imputities. Other T-Stoff resistant materials reported were: copper-free al-Joseph evisions resistant macrimate reported ware: copper-tire al-minimum alloys, chromitum studies (with not least than 11% as a softeness) and polyechylene plastic. The Buna 5 and polymynlyholstede without a softenet, were less teamed whether the polymonial was not constant at all (CIOS Rept 30-115, pp 12-13).

In order to determine the assented of T-Stoff, without The operation of the control of the

According to ClOS Repr 30-113, p 8, when T-57806 as Z-5coff (see above) se MP-14 (q v), superfranced steam was formed (together with exygen) because about 552 kml/kg were liberated and a very high temperatum (480 C) was attained. The stream obtained with a solid catalyst (such as MP -14)

an autrable for diring the turbine, whereas the steam obtained with 2-Souff was a constrained of diring rockers or A TO (assigned take-off) surfable for diring nuthance because t concavaed anall particles of diring nuthance because t concavaed anall particles of Mn O. When T-Stoff was mixed with S-Souff (hydraums bydrate) in the presence of K cuprocyanide, the resulting liquid was found to ignite spontaneously.

. One of the most interesting applications of T-Scott was as a source of power for submarines as proposed by Dr Hellmuth Walter (See U-Boot Valter). Seven such submarines (300 to 500 tons each) were accepted, by the German Navy up to the end of WW II.

Dr Walter, who is now working in the USA, recently published a paper (Ref 7) describing hydrogen peroxide as a source of power. Beside submarines, be lists the following German devices where hydrogen peroxide was used as a source of power.

6) A 500 kg ATO (Assisted Takes Off) H.O. month fuel unit b) A 300 kg thrust, rocket propulsion unit for guided

minsilea c) A bipropellant 1000 to 1500 kg ATO

d). A catapult with hydrogen peroxide propulation

unit (decomposition only) for launching V-1 s e) Controllable propulsion of a 750 kg thrust unit (or the Messerschmitt 263

f) Rocket training airplane and a controllable power plant giving to 2000 kg thrust for the Meanerschmiet 263 B.

References: 1) Dr Nitschmann, Physical and Chemical Investigations of T-Stoff Solutions, I G Farbenindustrie Rept 597, Oppen: Germany (1944)

2) H. Walter, Report on Rocker Power Plants Based on T-Substance, NACA Rept No 1170 (translated from the

3) Logan McKee, Mechanical Engineering 68, 1041-48 (1946), Hydrogen Peroxide for Propulsive Power, Product tion and Use by the Germans during WW II 4) E.S.Shanley & F.P.Govenspen, Ind & Eng Chem 39.

1536-43 (1947), Highly Concentrated Hydrogen Perceide, Physical and Chemical Properties

5) R.Simard, The Engineering Journal of Canada 31, 239-25 (1948) 6) F.Ross, Jr. Guided Missiles, Lathrop etc. NY (1951).

DD 45-6 7) H. Walter, Jet Propulsion 24, 166-171 (1954) Ex-perience with the Application of Hydrogen Peroxide for

Production of Power. Note: According to H.A.Curris, CIOS Report 28-62 (1946). P 23 the code name T-Staff was used for 82% hydroges

peroxide, while the code names Aurel, Neuralis and Subsided were used for any 80-86% hydrogen peroxide. According to R.C.Stiff, CIOS Repr 50-115 (1945), p. 8, the 1-5roff was also called ingelin. T-Staff, Benides being a designation of a concentrated

hydrogen peroxide (see above), the word T-Stoff was used mes designate the (acrymator (Transpostoff) vonsisting of a mixture of bromides of on an and pr inomers of aylene.

a mixture to consonant, of our man pressure of Artestee of the Colombia of the

T-Steff (SS). Hydrogen peroxide contrabut 20% of water and stabilized with an incident (400 mg per liter). Decomposition Number (q 20 liesy than I. Specific gravity

at 200 same as T-Smil (S). Used in limit rocket am-Reference: R.C.Stiff, CIOS Report 10-113 (1945), 6 9. Überghlarsinen . See Perchlone Acid in the general

Chertragungeelistens (Transference Distance)'. According to A. Seembaches Schiege- and Spreamaffe, Leipzig (1931). p 46, the diamete (d) in meters may be expressed un:

(c) is the weight of an explosive in kg and (k) is the reastant equal to about 2.5.

(See also Gap Tear in the general nection).

Übertregungskpuffizient eder Senzibilitörskooffizient (Transmission Coefficient or Sensitivity Coefficiend According to Stett backer, Schiest- and Sprungemilie. Leipzig (1933), p 43, the coefficient of managizaire of deconation by influence (Le) is calculated from the following equation:

Le = c/c, , when

(c) in the weight (such as 50 g) of an explicative to be instituted by influence and (e. ) is the weight of a standard explosive, such as picrit acid (P A ) solving as as initiame by influence.

if the distance between explosive charges in 15 cm. there is order to demonsts 50 g of P.A. (c = 50), it would require 30 g of P.A. (c, = 50). This would give for the (La) the value of 50/50 = 1.

in assist to decounte 50 g of TNT (t = 50) is would im successary to use 68g of RA (c, = 68) while for 50 g of terryl only 28 g of P. A would be required. This gives for (i.e) the value of 30/68 = 0.78 for TNT and the value

of 50/28 = 1.00 for purpl.

Note: The higher the value of (Le), the more sensitive in an explosive me intrincion by influence.

U-Beet, One-Men; Oce-Men Subscrine or One Men Torpade (Ein-Man Torpade), This device connisted of a sanil one and subscrine to the bottom of which a torpade was attached by means of shartles. The combination was propelled by an electric most in the submarine operated by storage batteries. The paint brought the device to wishin a fairly bacteries. The plans brought the certice to widths a lastly about dismance of the target (such as as enemy ship, dock, warehease, wit; ) before priesting the 'copyedo. The toppede calc sized by lining so the submaries with the target. After the property of the plant of of

Note: Scale of submarines were peopelled by internal combustion engines (Ref 2). References

Anou, Field Artillery Journal 34, p 305 (1944) 2) Private communication from an engager the sorted on their construction and who requested that he same is





U-Boot, Poeket (Pocket Submerine). See Sochund

U-Boot-21 oder Unternenhaar 21 (U-Boot 21) (Sono-merin 21, to French) was a submarine developed in the last pare of WW II but not produced in large quantity. It was 77 m long, 61/2 m wide, displaced 1600 tonu and wan peovided with 3000 HP Degreis and 3000 HP electric motors. Its speed to submerged condition was 18 knots nanimot .7 knots of the older submating models "7" and "9". The U-boot-21 could ravel as such as 30,000 niles without refeelling or restocking.

References A.Ducroce, Les Armes Sacritos Allementes. Paris (1947), pp 24-26.

U-Bost Walter (U-Beat of Walter) (Submarine With Chauical Propulsion) . (Sous-maris à propulsion chimique, in French), in order not to be dependent on amougherie oxygen for the operation of submarine Dinnel enginess when in submerged condition, H. Waiter and collaborators designed a draice in which concentrated hydrogen may oxide (T-Stail) was casslymeally decomposed in the percence of Ca paraunganess into mater and onyging The oxygen was used for operating the Diese. same time, the energy liberated on decomposit h of the hydrogen peroxide, which amounted to 590 kg//kg/(cnl) culated for 100% peroxide), was stalled to of fact a gr rubine directly consecred to the propeller shalls a by-product of this reaction pure water was obtain which was used for drinking and croking purpose

According to Ref 5, the above system was called "Closed Cycle Disuel Development for Submerged Propulsion", and the idea for such as engine goes back to the time of WW I when the Germania Werit at Kiel tried to use computered crypts for Dunels. No work on the subject was done until 1939-1940 when the German Navy requested some fitme (such as Zeppelin Gmbhi, Kommandir Genellachtat Bains) and research institutions (such as the Fonctiongauestour diff 'Emittheneuge, under the discretion of Prof Lanne sed by thebri to resource the project, and the second of the secon requested some firms (such an Zeppeiis Gmbit, Kommandi and two outboard tylinders with compressed origins. The Kamm's equipment was somewhat bulkist than that of Valor: in addition to the type KVIK submarine, it was planned to build a submarine with a smaller regime and so use liquid oxygen carried in two insulated tanks. The work on the closed cycle regime project did not progress very fass as it was considered by the High Command to be of Very last he it was considered by the ripp community of the secondary (higherency: 10 to 10 (See also Scenario and tuder T-Saoff).

(See also Scenario and tuder T-Saoff).

(See also Scenario and tuder T-Saoff).

Kiel her described by R.C.Stiff, CIOS Rept 30-115 (1945).

Noon: According to Chem Engrg News 32, 1956 (1954). the British, us the yard of Vickers-Armstrong, at Berrowin-Furness, launched a submarine called the Explorer which is to be propelled by hydrogen peroxide. Lafermore:

1) A.Ducrocq, Lan Armen Secultura Allemenden, Paris (1947), pp 26-31

2) R.Simard, Eug J of Calada 31, 239-25 (1948), C.h. 42.5622 (1948) 3) H.Schneffer, U-Bone 997, Norson, N Y (1933), pp 181-2

4) H.Welter, Jet Propulsion Z4, 168-9 (1954)
5) A.H.Schilling, German Naval Closed Cycle Development for Submerged Propulsion, CIOS Report 30-76 (1945).

Underweter Explantana and Explanives See Unterwanner Speengungen und Speengamffe.

Ungefrierberg Dynamite ader Schwergefrierberg Dynamite (Non-frequing Dynamics or Difficultly Frequing Dynamics) are described in the general section as Low-invenion Dynamics. The following substances or their mixtures were

used in Germany in order to make the NG containing explosives non-freezing at winter temperatures:

Missoglycol, disexochlorohydrin, dinitroglyceria, meranicrodiglycerin, dinicroformin, dinicroncerin, buryleneglycoldinitrate, sad aromatic nitrocompounds such us MNB, MNT, DNT, etc.

References: 1) P. Neoum, Niconglyceria (1928), pp 356-381

2) A. Steutbacher, Sprang- and Schienumife, (1948), p 61.

Unhnown-Home : Explasives . The following . German compositions were described in Altied hid Enemy Explosives, Aberdeen Petving Ground, Maryland (1946), and other nources, but for which no names were given ."

a) RDX/TNT-50/50 and 53/67. Usedia shaped charge summittion (shells, greendes and demolition charges (caselonded)] .

b) RDX pellets embedded in TNT, Used in 4000ks bombs (cass-loaded)

c) RDX/TNT/Wax - 51/48/1. 55/42/3 and 58/40/2. Used for case-loading various shells, -

Unterwesserengeneffe (Underweier Explosives). Extensive study of underwater explosives. Explosives of underwater explosions (Unterwaterspressum grap) and of German underwater explosives was considered by De A-Sternard and Constant and speen game pen) end of German underwater explosiven was conducted by Dr A. Shetthacher, Zürich, Switzerlamit He described some of his investigations in books and papers published an Germany and Switzerland (See Refs 1-5). Some additional information on German and Switzerland Common was communicated to the author by Dr. S. replaces the second of the sec values of underwater effectiveness given in this report are not included in this work.

age not included in this work.

According to Sectioncher the principal explosives
used during this for loading the see mines (Seminen),
depth charges (Tiefmonben) and corpedoes (Tongedos),
commissed of TNT and HNDPhA (herastrodiphorylamue). One such explosive composition consisted of TNT/HNDPhA - 60/40, while another contained TNT/HNDPhA-35/65. The latter mixture was called Schiosswelle resure

Note: It is of interest to report that previous to \$17 and se early as 1978, the Germans, in their underwater amminion, used mixtures of TNT, HNDPhA, TeNA (term sizossiline, called Term in German) and TNB (traitrobenzene). Straight TNT was also found to be suttable as an anderwater explosive. Towards the end of bal large proportions of aluminum powder were introduced in under-water emplosives. One such mixture, known as Scheins solle 18 (abbreviated to Schw 18 and later called \$-!) was used

sucressively during WWII. Its composition was TNT/ Note: Stettbacher's reported analysis of this mixture was

61.8/23/15.2. He suited that to was very effective is all kinds of underwater charges. At about the same time as above (1918), a mixture to which PETN was used in lieu of INDPhA was introduced it was called Schw 19 and contained PETN/TNT/Al

It was called Schw 17 and Continues Factor 1936), the Stated to rearm (about 1936), the minimum called 5thw 36 or 5-2 (TNT/HNDPhA/A) - 67/8/25). made its appearance. At about the same time the Chemisci -Physikalische Versuchennetalt (CPVA) proposed -by similar converse venue nanamata (LPVA) proposes several explosives in which RDX (fetrogen) was used by line of his propose of his propose of the propose of his propose of the propose

Several compositions in which ammonium nitram was used as one of the maredients were insupduced before and during Will They included Schw 39 or \$-3"(NH4NO) and during Will. They included Schw 39 or 5-3 (NHANO)/ HNDPh ATTNT/AI ground - 9/N/4/20), Schw 39c (NHANO)/ /HNDPh ATTNT/AI ground - 5/10/50/35), Mixture (NHANO)/ADX/AI/wer - 35/28/5/35/1.5), 5-16 (NHANO)/ Etbylenediamin

Ethy tenediaminediates act (NDX AV ANNIV NENDED 20 11) or 40/2/5). Some America, imong them the America 30 (A) ASS explosive (NHANDY Direxediamide/PSTN - 70/140/20) of Ass explosive (NHANDY DIrexediamide/PSTN - 70/140/20) of Ass explosive (NHANDY DIDEX A to addition to the above measured case and above to following other underwaser explosive compositions contained "Pr. TWe-PETN/Al founder/Fax - 683/30/3.5 (Contained Pr. TWE-PETN/AL FAX - 683/30/3.5 (Contained Pr. TWE-P

pacened charges. Mixtures of PETN with NG (nitroglyceda), in which may be incorporated some collodion cotton, were proposed in 1929 by A.Stettbacher under the name of Postrinita. (See Swiss section of this dectionary). These mixtures were

Uses were sectionary). Lees mixtures were found to be effective in underwater explosions.

Below are listed additional explosives proposed before and during well for use in underwater ammunition it should be noted that some of these explosives were odly experimental

The first mixture is about 2% times as effective as TNI, while the second mixture has the advantage that it can be pressed to a high density of 1.84 (See also explosives S-6, S-6 modified, S-16, S-19, S-22, S-26, E-4 and KMA listed under Ersattaprensatoffs)

1)-A.Stettbacher. S 5 25.233-34 (1930) (Explosiones as ter Masser, Torpedo Wirkung)

2) A.Stottbacher, Schiess- and Sprengstotfs, Leipzig(1933), PP 396-401

3) A.Stetbecher, Prome S, 83-92 (1942), Kvie gesprengs rolfe 4) A. Stertbucher, Protes 9, 53-45 (1943). Uber die Wirkung von Torpedos, Mines, und Tiefenbomben unter Beruckaichtigung des deutsche Hariso-spongavoffe, vom letzen and houriges Welthries)

5) A.Seetchacher, Sprong und Schieseroffe, Zürich (1948),

5) 1.5.Coles et al. NDRC Report No A-161, OSRD Repa 624 [about 1945), pp 31-9 (Con desanal) 7. Rall.Cole, Underwarz Explosiona, Princevto University Pens, Ponctona, New Jersey (1948), pp 147-424 8 OW.Sackimed et al., PB Rept 1820 (1943) 9. A.Smuthorie et Zizick, Switzediach; private communica-

thererwessersinder (Underwater Ignitet or Primer). De-actibed in C. Beyling and K. Drekopf, Sprengstyffe und Zimanitzel, Berlin (1936) pp 174, 223 at 237.

Uresin S. Plasticiner for NC sade from callulose accuss ned formulebyde (CSOS 28-62.9 24).

V-1 ada Vergaltungswelfe Eine (V-1 op Revenge Voupen One). The official German designation was FZG-76 place(winered rocket) which could fly at a speed of 300-360 siph at a beight between, 2,000 and 3,000 feet and to a dismace of 220 miles. It could be insuched from a campuit, or released from a pilosed place. The body of the V-1 recise was cylindrical in these, supering sounced the news; discounter-2-7" and notal length 21-5% Fully loaded it unighed 4,750 lb . It was propelled by a polar-jet ongine using 130 gallons of gasoline for fuel and compressed his as the exidiner. The warhend contained some newly developed capterive (age below), which could sufficient thin temperatures. These melves were freed against England, beginning in June 1944, and caused considerable demange. References:

1) A.Ducrocq, Los Armen Secriton Albemanica, Berger Lucesult, Paris (1947), p 35.

2) F.Rono, Jr. Guided Misnilen, Rochecs and Tomordons. Ledesp, Lee, Shephard, N Y (1951), pp 14-20

K.W.Garland, Development of the Guided Missile, Flight Publication, London (1952)
 Anos, Germon Explosive Ordanace, Th 9-1965-2 (1953), pp 207-10

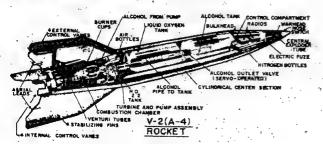
W.Doesberger, V-2, The Viking Press, N Y ; (1956), 3) W. Dem serger, v., 93.-96
93.-96
6) A.S. Locke et al., Guidance, Van Noatrand N V (1955), pp. 34-3, 56-7, 71 & 76 (Book 1 of the "Principles of Guided Missila Design", edited by Grayson Metrali) (See illustration on nazz succ).

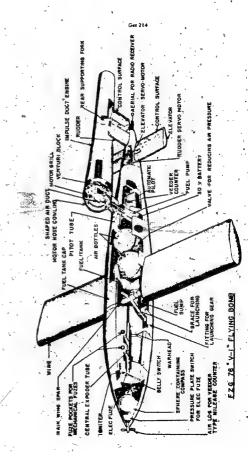
V-2 oder Vergeltungswelfe Zwei (V-2 or Revenge Wenpo Two). The official German designation was 4-4 . V-2 was a cocker provided with 4 stabilising line. It could (Iv with a speed up ur 1600 mph to a distance up to 220 miles and at altitudes up to 50-60 miles. The body of the rocket was cylindrical in shape with a some tapering to a sharp point. The largest dispeter was about 5' and the overall length was 46', Fully loaded it weighed about 14 tons, which included 9 man of feel supply and about 1, ton of special explosive that could withnessed high rempetatures in the wethend. The first of these rockers was fired against Easland in Sept. 1944. A total of 1115 V-2 rockets were fired up to April 2, 1945, and they caused considerable damage especially in London and vicinity

Table 62 gives some additional, information on taken from the book of Gatlend (Ref 3, p XVII). TABL | 47

Characteristics of V2	Metric	U S
League	14 =	46"
Diameter of body	1.65 m	3.3.
Take-off weight	12,900 kg	28, 4401b
Paylord	1000 kg	2205lb
High explosive casied	750 kg	1654th
Alcohol (Cours 25% water)	3965 kg	6740Lb
Laqued oxy gen	4970 kg	10.93716
Thrust, as take-off	25.000 kg	55,100lb
Thrust gain near Breanschluss	4200 kg	13.23CLb
Fuel consumption per second	127 kg	280db
Alcohol'/ oxygen meio in mixtu	re . 0.	81
Maximum barning time	6	s sec
Temp in momer '.	~2700° C	~4890°F
Paramore in motor	15,45 axe	227 pes
Nozzle expension recio	15-4	1:0.85
Exhause velocity	2050 m/ eec	6725 ft/sec

(Same as given under V-B





V-1 and V-2 (Explanious Used in Verboade of). At first both the V-1 and the V-2 used mixtures of TNT and Am airrate. These were replaced by Amatol 39 (DNB 30; Am nurses 35 and RDX 15%) or by Amarol 40 (Dinitroanisale 50, Am sitre'te 35 and RDX 15%). While Amarol 40 was suitable for caut-loading, the Amerol 39 gave occasional cavities when case-louded alone.

la order en eliminate the cavities in cuse-loading, Romer proposed later to pour the Amerol 39 over pieces of Biscuit Minters A which consisted of Am nigrate 50, rechoical Ca nivete 25, PETN 10 and RDX 15%.

Still inter in the way, when the shortage of arountic compounds became more arete than ever, it was proposed to any mixtures not containing the nigrouroustics, as for instance; technical Co names 55, powdered peat 5, Al porder 10 and 30% of 90/10 methyl minute/bessess min-

Reference: G.Röser, PBL Rept 85.160 (1946), p 19.

V-1 and V-2 (Propollours Used in). As wis mentioned under Rocker Propellents (Liquid), the Germans used compersued air as the unidizer and question as the fact, in the Y-1. For the Y-2 recket they used liquid oxygen so the exidizer and ethanol containing some water at the

Nose: According to J.G. Tectimiert, Chen Engle Nows 32, 2584-(1954), water was added to slooked in order to keen the flowe temperature sa low as possible to avoid direnge to the combestion classiber of the cocket mores. For the name reason fuels of higher heating values, such as gazoline, were not used in these rockets. It was found that a mixture of situated and 25% water had a flame temperature 7% lower than pure alcohol while its exhaust velocity was only 3-5% lower. This means that on adding 25% of water to alcohol, is was possible to use a semewhat lower structural structch for the motor without sacrificing too much is performance. The same number on p 2585 states that in 1944 perpurations were made to replace liquid oxygen in the V-2 with absolute nimic acid.

# V-3 (Vernelmagewaffe Drei). See Hochdrackpumpe.

V-22 Delay - ignitive that wan used in type 1 of the 15 cm RSSG Rocket, briefly described under "Pymorchaic Antiv.22 Datey - ipsites that wat used in type I of the 19 cm SSG Rocket, beidy described under \*Pyroschuic Assi-pandinder Deticer\*. The v.72 consisted of a seed sub-filled with cleary composition, and was occurred into the trocket (beinhir) head. The bod passed from the bending propellant ignated the charge (composition with 2.2 th seconds under a pressure properties of the com-position of the composition of the composition of the neutron containing the black pender aspelling, therefore was ignited. The delay compositions which serve employed over accountly owner commontaines. a s. C. or instant. was spined inc meny compositions which were simplified more accountly tracer compositions, e.g. Sr initiate 35.1, Sr carbonate 5.0, Mg (course) 17.6, CPVC (chloriamed polyres) chloride; with 53% chloriae 3.3, synthetic phanol-formaldebrde resis 10.0 and roats 3.0%.

normaterves resis 10.0 and rosis 3.0%.

Note: All Mg (course) had no pass through a sieve with
1 ms openings (No 16) and be retained on a sieve with
0.15 ns openings (No 16), white 60% west revokes
the attand on the course of References H.1 Eppig, CIOS Report \$2-36 (1945), pp 19-21.

Verbrennungswärme (Heat of Etplosion). See meeni

Yemichtung von Sprongstoffen und Palvern (Destraction of Explosives and Propellance), Beautiquing oder Un

schäfflichnachung von Emplastvatelfun (Eliminating or Making Explosives Harmless ). See general section under andividual auniosises-

Versuffungatumpereturprebe (Defingration Temperature Test), Entwindungmunktprobe (Ignition Point Test) is deactibed in the general section under Ignition Temperature Test and also in the following references:

1) A. Stetthacher, Schiesz- und Sprengstoffe (1953), pp 373-5
2) Kasr-lietz, Chemischev Unterhuchung der Spreng- und 2 Sadaroffe (1947), pp 341-345

1) A. Stertbacker, Spreage und Schiesanoffe (1948), p 120

Vaccticutus Chromenmentt (Reinforced Chromenmonite). Out of the safety explosives in which TNT was the ertive base: TNT 12.5, Am nitiate 70.0, K nitrate 10.0, Am chrone sium 7.0 and wasting 6.3% (Total adds to 106%).

References Colver, High Explosives (1918), p 250.

Vorsuchegrune GmbH, Trameriu. Experimental Mine at Dorumend, located previously to 1945 at Hilbertia Mine, Gelzenkirchen, was used for the investigation of maning explosives, such as methods of summing se bose holes, gaining of gas and coal dust, relative salety of show ignition of gas and cost dust, relative safety of shouthed explosives, photographic study of flames produced at the boot-hole cannot by different explosives with various methods of loading, vice. Reference: BIOS Fund Reps 1256 (1947), pp 5-6.

Varquehatrocke · (Testing Gallery) · See Schlagwetter versuchaurecke and also the general section mader Gallocies. Testing.

tering. Testing.

Vernachenwechs. Dermaned-Durine (Testing Gallary as Dorenand-Derse) was used for the following officied mans of peratured explosures (Testing Gallary as Dorenand-Derse) was represented to the second of the se c) Ability to Tenantal Deconation (DeconmonalShighnit) was determined by the no-called "Four Carridge Teer"

was determined by me was formerly determined in a type of ballistic pendulum. Duly No 8 desinances was from the series showed the based in cust makes. The sense filling for such detronstore the customers of the sense of the se

Vinidus. Code name for polyvinyl chloride without planti-cizers (CIOS Rept 21-3, pp 5-6 and CIOS Rept 28-62, p 24). Viscoffen eder lgebit PC., Highly chlorinated (65%) polyvinyi chloride (ClOS Rep 28-62, p 24).

Visel. Trade name for a liquid rocker fael (Beenseroffe)

Visit. Trade smeat risk as the control of the contr

Note: Visol fomes with strong nitric soid a hypergolic

Note: Yison Found with nations minic aced in symmetric (self-igniting) combination.

b) Visyl sther (see Note) 40, iso-propyl sloshed 40, water 2. The remaining 18% consisted of four other in-gredients including Pt of a dope to control the ignition

duley time (Ref Z).

Nose: Visyl echer of item b) is sopamatly visylisoburyl
eches, as on the same page of Ref 2 the sustement is made
that Visel is a connected code same ber visylisoburylather
c) Visol 6 (See auxi time).

Referencess
1) Gollin, Rockets and Directed Missiles, ClOS Report 2) Anos, German Explosive Ordanace, TM 9-1985-2 (1953), p 220.

Visal 6. Trade name for Vinylathylathor, described in the general section. It was used during WW il as a liquid socket propalling fuel in guided missiles such an Earing E-6. Rheintochter R-3 and Wasserfall. Absolute attric aced was used in these missiles sa the oxygen carrier.

1) Ason, Aimy Ordnesco 31, 30 (1946) (Wasserfall) 2) E.V.Garland, Development of Guided Missiles, N Y (1952), 114-27.

Velport of Dommund parented in 1896 and 1897 several mining explosives, such as: a) K nitrate 40, NG 30. colled cotton 1, Mg nulface cryst 24, suspentine 4, and sode-eak 1%; b) K pyrounifate (K,S,O,) 7.5, Am nitrate 82.5, asphinaless 5.0 and fearocyanide 5.0%-Reference: J.Daniel, Dictionnaire des Mitières Explosives,

Parin (1902), p 789-VacDelmen Expinsives. See Dalmen Explosives and also

Dehmeniten.

VanStubenrauch Explosives. See Stubenmuch Explosives...

Verkertusche (Ferward Charge). Sen under Cordite Charge Casings.

Vorteen (Agriffanh Bag) (Livernily "something put before") According to Davis, Explosives (1943), p 324, the Vorlage used during WW | constant of doughast shaped corns or artificial silk cloth base filled with coeraely pulverized K chloride, Two such bags were usually placed in a canton between the base of the projectile and the prooellest charge. .

In firing with Vocince there were produced at the muzzle a red light (glow) and a red amoke. The light gave no reflection in the sky but was visible if the piece was pinced in such a way that the enemy could see its muzzle. In the daytime, the Vorlage was used only trhen the weather was so dark that the flashes of the gas without Votinge were more visible than the clouds of reddish smoke produced by the Vorlage.

"Velken". A fibrous material prepared by hydrating a cellulose with Za chloride, it was used for self-sealing garoline tanks. Reference: CIOS Report 21-3 (1945), p 4.

Wachsender Drell ader Zunehmender Drell. See Progressive Refling.

Walten. See Wespons. . .

Westenwager (Weapons Carrier). Several models of amored vehicles designed for carrying field guns were developed during WW II by the firms Krupp, Sceyr, Rheimmetall-Bornig,

Reference, CIOS Report 29-20 (1946).

Wallarada (Pulvar), A type of sporting propellant manufactured for many years by the Wolff Co at Waterode in Germany and by the Chilworth Gunpowder Co, Ltd in England. The original propellant was prepd by gelatinizing pure NC with ethyl scarate and adding water (35% of rotal volume) to the resulting jelly. Then the mixture was kneeded and , while continuing this, operation, live strem was introduced. This resulted in the formation of very small grains of gelatinized NC. For removal of volatile nelvent, the grams were treated under pressure with boiling water and then dried (Ref 1). The composition of such a propellant, given in Reis & and 4 was as follows: NC 98.6 and volatile matter 1.4%; its calorific value was 1014 keal/kg and volume of gas at NTP 875 1/kg of which 14.8% was nivogen. .

A different composition for Valerode was given in Ref 3: suncotton 77. Ba nitrate 10, grease 7.0, agarager 3.0, glue 7.0 and maisture 1.0%

Reference #1

1) I.Daniel, Dictionanire des Matières Explosives, Danod. Paris (1902), 2p 801-2 2) A. Marshell, Explosives, Churchill, London, vl (1917)

3) H.Brusswig, Like muchione Pulver, W. de Grayren,

Berlin (1926), p 134 4) Thorpe's Dictionary of Applied Chemistry, Longmans Green, London , 4 (1940), p 530.

Walter Emplosives . See Explosives Developed by H. Walter et al.

Welger Submuring-See U-Boot Valver-

Walther Cold Rocket Unit, such as used in the Hadri surface launcher rocket, used bydrogen peroxide/persurface launcher rocket, used nymogen peroside/per-manganane as the propellant. No details are given. Reference: K.W. Galland, Development of the Guided Misaile, "Flight", Publication, London (1952), p 117.

Warminghoversuch (Warm Storage Test), called also Logerbearundisheit oder Heltberkeit (Subility in Scorage or Stability) is a test similar to the American Surveillance Teas, it was conducted by storing a 10 g sample of a propellant (or an explosive) at a temp of 75 or higher in a closed giage vessel until the appearance of nitrogen oxide fumes. The longer the time tequired for the appearance of fumes (which might be from several days to several weeks) the most amble was considered the substance under test.

Other Stability Texts are given in the general section Del ameret :

1) Stettbacher, Schiese and Sprengstoffe (12:3), p 201 2) Knot-Mets, Chemische Untersuchung, erc (1944), p 458. WARPLANTS, ARSENALS, RESEARCH CENTERS, PROV-ING GROUNDS, etc.

(In collaboration with H.A.Tisch of Picatismy Arsenal) the connectation was made to the Government and private installations as complete as was possible to obtain from the literature and BIOS, CIOS and PB reports.

the literature and BIOS, CIOS and PB reports.

We plants were usually constructed in a forest with a minimum removal of trees. Buildings were of permanent and disrproof construction such as resistenced occurs with one weaker safe for buildings were usually greater with one weaker safe for buildings were usually greater and British regulations. The Boors in the buildings were relater rough, but they were lapt clean by workers and British regulations. The Boors in the buildings were rather rough, but they were lapt clean by workers in a No versibeen on phashevical line are included numerous in the minimum production of the phashevical line are included numerous the second of the phashevical line are included numerous the second of the plants of the production of the phashevical line are included numerous the second of the phashevical line are included numerous the second of the phashevical line are included numerous the phashevical line are included numerous

In the enclosed niphabetical lies are included numerous ablant and institutions more of less connected with armanent during WB II. Mejority of these contributions are closed or are out of sustance but many of them can be

Adem and Horn Sprengemit Fabriken. Plast at Karisee (Explosures)

Adam Gerhard Motoreswerke, Oskau Friederichsdorf, Sudgengan (Motore) 1b) AECa Ste Allgemeine Elektriaitate Genellschaft

-1.D)—AECL——Ster. All genoming. Elektrishtöte. Genel Elektrishtöte. Genel Elektrishtöte. 27: Allendysamische "Arval). Archiete Sterich anische (Avval). Külzer-Wilhele Barrist, Göttingen (Alendynumse research). 3a) A -Q. de Allendynum (Alendynumse research). 3a) A -Q. de Allendynum für Sterich und Ziahabiterensellung des Allendynum für für Sterich und den Betrach, Essun/Betgarbothert (Contact and chamber salfung auf plants) (BIOS 1653)

3b) Air Fonce Proving Ground, See Waffenprüfungnateile der Lafeun fe Lufdichtriotechung (ALF), Betim, Andemie der Lufdichtriotechung (ALF), Betim, Andemie der Lufdichtriotechung (ALF),

with elective membership). It promoted research in many fields of science (Ref én. p 78) A.Knapp Berndötter Mernliwarenfabrik (Wesponn)

A.LF. See Anademie der Luftmardemechung.
Alfmd Krupp, Essen Berbeck (Sepul fonadries)
(See BIOS Final Rep. 716)
Allgemeine Elektristen Gezeilschaft (AEG), Berlie

Allgemeine Elektrististen-Gereilschaff(Abc), beine (Electrical equipments, cables, vecters, esc. Nümberg (Andr., Hilpere-, Pegasitabuse A.-G., Nümberg (Acid plans aquipment) (Andr., homb nights, submanue (aprumento- and equipment) (See ClOS 23-29) Assobiux (IC), Zeila Mehlin, Theiringen, (Sonii anna), Ardeit Wathe, Eberrawiled Benjan (Machinery)

Amy Proving Grounds. See Wallenprüfungstellen den Resere Arthus Erupp A . to. See Bemdorfor Metallwarenfabrik

ARTUME RANDO A - 0. See Demoorter Mecalumentabria Anthul Emph A - 0. Accoliforabusger Zellszoilwerke A - 0. Scockstudi an Mana (Wood pulp, stalizazion of the black liquora fron the sulfite holls for the manufacture of ethanol and years, various chemicalls) (See CLOS 36-34)

Angust Engels, Velbert, Rheinland (Steel foundries) (See BIOS 716)

13a) August Thysnen Hutte A.G. Hamborn (Metal-

13h) AVA. See Aerodynamische Vernuchungenie

(AVA., SE Ausseymannesse yerrusunangari, Badische Aulin. & Sodafabrik A.-G. (BASF), Oppan bei Ludwigshafen s/R. Yantous chemicals including some explosives) (BIOS 1442-, 8); Budische Volframers Gorbell, Söllingen bei Knitzube-ferrorally9): (CIOS 30-5); Danney-leepun A.-G. Berlin (Design and construction of chemical plants (BIOS 1442, pp. 119-17)

17a) BASF, See Badische Amlin-& Sodafabrik A -G

176) BASF, See Badische Anslin-2 Sodarnorix A -6
17b) Bayerische Maschinestwerke (Baye), bes München,
(Research and development of rockets using an fuel
hydraxine and some amires and as oxygen carrier
concel nitric need conig about 10% sulfarire need The futi was known as Tanka and the acid as Selber (See ClOS 28-56, pp 25-26)

Bayerische Spiengsmifweite und Chemische Fab-riken A-G, Numberg-Plants at Klouter, Lechfeld, Neumatkt and Parsberg Miscellaneous chemicals

19) Bayerische Stickspoff A. G. Piesseritz (Rittie erid) Note: According to BIOS \$39 the plant was manuferred to Russia. terred to Restate.

Becker & Hollinder Vallenben, Sahl (Sanil same)
Becker & Hollinder Vallenben, Sahl (Sanil same)
Berchelz (JoR. N. Hamberg Bahrenield (Vartess
pyrotechar (sense) (BOS 123))
Berghen. And sveel pyrotechar (Colo. 24-55)
Berghampengesth and Send pyrotechar (Colo. 24-55)
Berghampengesth and Zandautziwert, Schönsbeck
Elbe Electron (Sanon que)
Bergasche Scahlindsterre, Reuscheid (Steel foundries)
Bergasche Scahlindsterre, Reuscheid (Steel foundries)

Dengai eer offinisienteite verke, Abreilung Verficaban, 1918. 710 Industrie Verke, Abreilung Verficaban, Suhi und Veitren a'Main (Small anna). Suhi und Veitren a'Main (Small anna) Berigwerigwerischaft itheorient burken (ELM, Löberigwerischaft). Berigwerigwerischaft in 1918. 1

BLM . See Bediner-Libecher Maschmeninbriken

BMW. See Bayeriache Maschineswette
Blumberg & Co. Linner bei Dässeldorf (Various
pyrotechnic Rens) (BIOS 1313) Bochumerverein A . G , Bochum, Ruhr with several

plants, such us:
a) Bochum (Metallurgy, cumuritugal casting of

sun tubes)
b) Vermar (Metallurgy)
(See BiOS 716 and CIOS 27-42 and 29-39)

Böhmuche Weifentsindt-See Contoniovenska Shrojovka Stamments in the Carchoslovekian section Bothe (W), Wolfenburtel, Heimsenmannen (Blancing)

"muchines)
Brown - Boveri & Cie A - G Massherm (Electricity)
Brückes & Zinke Zünduchaufabrik, Meissen (Salety

tuses) Brick, Schlösser & Co. Ossabrick (Appearant for mating explositest by the methods of Bichel and Mettegens)

BSV. See Berlin-Sukler Waffen- and Fahrangwerke

Buck - See Hane Buck Budarich Vedre, Gennany (of Gebruder Böhler A - G

provided weaky, commany for trebuter poblic A-G, Wen, Austral (High reality seed) (CIOS 73-14) Buderus Eisenwecke, Werdan, (Centriugal cavting of gas tobes) (CIOS 73-9) Burberg (Gebrüder) (Imbil Manchines/abrik, Mettassen, bei Dieselfoor (Installations for the manufactures of the manufactures of

explosaves, propellants and manunition)

42a) Büscher - Gewehre, Zella Mahlis, Thüringes (Small

ams)
Busch - Jüget Edenscheider Merallwerke A-G.
Lüdenscheid, Verfalen (Ammunision)
Bissing - NAG Vereioige, Nuxikrafwagen Gabli,
Brauschweig, Several metallurgical phants, which
employed during VW-D up to 5908 workers nemdy
half of them foreigness (CiOS 28-46, p 13)

Carbonit A - G , Ramburg, Plant at Schlebusch (Explosives)

(Explosives)
Carl Fleming, Hamburg Neugmben (Ground and ship pyrotechnic signals). Plant was destroyed Chemische Dingeriabrik, Rendaburg (Sulfuric acid) (BIOS 1642) Chemische Fabrik Kalk GmbH, Köln/Kalk, founded

to 1857 (Acids and morganic chemicals) (BiOS 1442, n 1051 p 105) Chemische Febrik Wesseling A - G. Wenneling, her Koln (Sulfurse ucid) (BIOS 1644)

Chemische Werke A - G , Thomaso (Chemicals and

Chemisch - physikalische Versuchsmemit (CPVA) der Ersegemeine, Duenisch Nienhof (Navy physico-che-nical research institute) (See ClOS 33-2 and 33-66) Chemisch-cethnische Reichnaustalt, vormals Militär-

versuchs and tRevenich and development matitution ter Amed Forces)

52al Consolidiere Alkaliwerke, Westregeln (Chemicals and explosives) 52b) CPVA. See Chemisch-sechnische Versuchsanstalt
53) Dalmier Benn Werke, Bedin/Mansufelde (Tanka and
other military vehicles) (CIOS 32-33). Plants are tocased at Unterturkheim, Gazgensu and Mannheim

Septe at Undertructuring, Laggans a and Mannetes

10. Degrams, Frankfurt a M.M. Plant at Hanna a M. (Saintred
tros and steel componency) (BIOS 599)

10. Demag A.-G., Douberg (Machinery and mechanical
equipment) (CIOS 26-77)

10. Demagoorif Pulvariabuth Kanigunds. Plant at Othfrasen

(Explosives) (Explosaves)
Deutsche Cahinatwerke A.G., Goaschwitz bei
Bautzen (Dygamiten, permissible explosives,
blasting explosives, propellants and funes)

Describe Edelscahlwerke A-G. Krefeld (Metallergy centrifugal canting, etc.) (CIOS 24-28, 25-38 and 29-39)

29-39)
Deutsche Einenwerke A - G Hilden, Rhineland and Mülheim Ruhr (Metallurgy) (BIOS 716 and CIOS

Deutsche Forechungsmatnit für Segelflug (DFS) Aloring (German Glider Research Station) (Guidec minules) (CIOS 32-66 and Ref 4s, op 7-11 h 76)

61a) Deutsche Messingwerke C Eveking A - G , Berlin/ Niederschöneweide (Ammunition) 61b) Deutsche Präposit Werke GubH, Ertlingen (Industrial

explosives)
Describe Pulvermetallurgische Gesellschaft, (DPG)
Femikfurt a/Maia (Sintered from and steel amministion

FREALTH AMERICANS OF THE PROPERTY OF THE PROPE

Deutsche Robreswerke A-G, Mulheim (Wespons

and ammunition)
Deutsche Spreigubenie GmbH, Berlin/Zehlendorf

Destache Servisphende GubH, Berlin uich plaate att al Decta (Propellants) a) Decta (Propellants) b) Feets, Brandenburg (Propellants) c) Kliets (Propellants) d) Kaniburg (Mc DeEGN, Napolit, etc.) a) Monchwig (Mc propellants) d) Oderburg (Solvendens propellants) a) Torgelow (Propellants) Passache Sopenatanache Fahrik Kile

Demoche Sprengkapseln Fabrik, Köln (Blassing

cape)

65) Deusche Sprengauff A. G., Hanbutg, Pinet at Wahn (Commercial explosives)

75a) Deusche Sprengauff A. G., Hanbutg, Pinet at Wahn (Commercial explosives)

75b) Deusche State (Commercial explosives)

67b) Deusche Versuchsanstalt, für Lutifahrt (DVL)

(German Exprenimental Essablishenes; for Flying)

12 was established in 1915 and during WW II there were about 2000 people employed, the bellisted apply 11, 75 & 79)

68) Devrache Weffer- und Monitionnfubriken (DWM) A - G. Katisruhe and Berlin/Bornjeynilde (Formerly Berlin-Katisruhe industrie Werke). Several planes, such as at Posen and Schildrup bei Lubeck (Various weapons

at Poses and Schultup Det Lubeck (Various weapons and snowswitton). Research was conducted at the Southeast Committee of the Sout

70b) DFS. See Deutsche Forschungsnastnit für Seguiflug 71) DHZ Chemie-Abreiling Sprenguoffe, Berlin (Explosives, primers, mixiators, safety fuses, sporting numunition, pyrotechnic devices, etc)

Domheim (G.C.) A - G. Suhl (Small arms)

75a) Dorming to Line to Sun (Small arms)
75a) Dorming-Derive Testing Gallery See Yerauchs-strecke Dorming/Deriv

73b) DPG. See Deutsche Pulvermetallurgische Gesell-74a) Draghan. See Fabrik Draghan 74b) Drahe und Memilwarenfabrik, GmbH, Salzwedel. (Amenacicion)

75a) Dr Alexander Wacker Gesellschaft für Elektrochemische Industrie, Burghausen (Chemicala from

acetylene) (C405 25-29) Delidaer Dynamit Fabrik, Dreuden. Plant at Muldenhusten (Commercial explosives) 76a) DVA. See Deutsche Versuchungtalt für Kraft-

fahrzeug DVI. See Deutsche Versuchssnathit für Luft-76b) DVL.

76c) DWM. See Deutsche Waffen- und Munitionsfabriken

Dynamit Aktiongeselfschoft (DA-G et DAG) - vurmeis Altree Nobel & Co. Hean office at Troisdorf, Bez Koln with plants at: Adolafurth, bes Heilbronn (Black powder) (CIOS

32-38)

Bergensdort (induscrial explosives)

Boblitz-Ehrenberg, her Leipzig (Glycena and other chemicals) (CIOS 32-38)

Draghan, Danneherg (TNT, industrial explosives,

ammunicion loading safety fuses, etc)

no.

Duneberg s/d Elbe, bei Gerstacht, Bez Hamburg, e) Duncherg w'd Elbe, bet Geratacht, Bez Hamburg-founded in 1880, During W II the plant occupied, as area of 1.2 ag. makes and suployed up to 8000 workers, many of them foreigners. The personect of the plant developed (in collaboration with General Use Gallwitz) various "cool" propellants. (Sea G Pulver and Gudolpulver).

Most of these new propellasts were manufe as

Most of these new proportions ways manufed as Disseberg No acids, NC, NG Dr. DEGDN were mented as Disseberg. The NC-NG on NC-DEGDN executes were neceived from the Krumsai plant in the form of Robpuleremases and blended at Daneberg by-passing chrough her rolls (See CISS Reports 28-61, 29-24 to 31-68 and PB

Rept 925)
7) Emperiter bei Hamanas (Amagairion for Plak,
Pak and infantry) (CIOS 32-36) as and intentry) (CIOS 32-36)
g) Forde an der Lenne, Gewenbrack, Wesstelen (Safety fuses, blasting cape (and detountors) (CIOS 32-36)

(CIOS 52-58)
b) Hamm a/d Sing (Black powder) (CIOS 52-58)
i) Haslock, Boden (Propellants and darkeldges
for small arms)

i) Kaufbeuren bei Landsberg/Lech (NC peupellentsbautung caps, determines and ammunition loading)
According to CIOS Repts 29-28 and 32-38, the Kauf-Nome: According to CLDN Keps. Data non Job. Bit. Similalary beuren plant belonged to the Dynamit-A of Similalary k) Kilomed Post Geenscht, Bes Hamberg, Founded, In 1865 by Albohel and then enlarged daring both "W"s. During WW II it occupied 1.5. sq miles and employed up to 9000 workers, many of time foreign

Work at this plant included some analysition leading and the production of TNT, PSTN-NG, NG, DEGDN, TEGDN, RDX, metaol-trainvascindustrial expositives, plantices, attin calcil, authoric acid and Robputvensianse. The last tree was nipped to the Duneberg plant for neuaniscaux of POL (solveniless properliant). The RDX transit of Kemer and Policy Reach of Re Work at this plant included some ammunition

1) Numbers (Steel case small arms semunition, hunting and sporting ammo and pyrocechaic items) (CIOS 77-36 and 32-38) mr Re Telementer, Elsass (Small arms ametunities)

n) Retruett, Schwarzwald, founded in 1872 as a black powder factory, was changed over prior to black powder factory, was changed over; pilor or W I, to single-base propellations. The plant was considerably expanded in collaboration annothing Note: This plant access to be identical with the Projector A - G plant described in CIOS Rept 26-70.

Samwellingers, &r. Saarlautern (Industrial ex-

o) Saarwellingen, Kr plosives) (CIOS 32-38)

pionives (CLOS 70-70)

Schiebusch, Leverkusen, bei Köln (TNT, NC, NG, PETN, PA, MF, LA, oleon and industrial explosives) (CKOS Repts 24-4, 29-24 and 32-38)

s) Stadeln (Steel case small arms amno, L.A. L. St. detonators, hunting and sporting nonemunicion) (CIOS 27-36 and 32-38)

n) Teoludies, Ben Köln, parent plant of D.A.G. constructed at the end of the 19th century, was considerably expanded before 80 HL At the peak of production it employed up to 10,000 workers of whom 2,000 were forcingness. The plant was severely whom 1,000 were foreigneen. The plans was severely demaged in 1944 and 1945 by hombe. Following demaged in 1944 and 1945 by hombe. Following street, and the properties of the properties of the properties of the properties, including compensions, defer and electric decreases, projections, foreign and laxes (See BIOS Final Rept 1) Wingsachof, Enrich, M. Sieger (Industriel explaints) (2003 37-39), called Gmidt law Various Colonia, and the properties of the prop

of Okts (Osternomano) reverses and analysis of Oktoberry, Taha (NIT), allerdorf, bei Kirchbain, Krein berburg, Laha (TNT, salluric sabydirde from spreng naltura acid and samusition londing) (CIOS 32-36) b) Aschas, bei bidildorf wlan, Obb (Nitrocellulose)

(CIOS 32-38)
c) Beblingen, bei Augaburg (Hexogen by KA process)
(Fairly detailed description is given in CIOS

Rep 32-6)
a) Broeberg, Westpenusen (DNB, INT-NC, NG,
b) Booberg, Westpenusen (DNB, INT-NC, NG,
b) BGDN, solventies propeilants, sommation loading,
sieum from apret sainting soid, see (CIGS 32-30)
b) Christiantisch an Bobre, covered during Will
many of whom were foreignen (Formatichyste,
Henogen, NG, NGn, Manchal Myrol, Tettro-dal
ned loading of boobe sood mail? calibre shelling.

News (CIGS Reps 32-34)
News (CIGS Reps 32-34)

als A - 6.

(Cleasthal-Zellerfeld, Herr was heavily demaged in Cleasthal and Condense in Control of the Control

for the Propedent section, it manual NC and solvent propellents (CIOS 32-38) ) Glowen, Wampriegatts/Havet, nziginally denigated as a NC plant, was manufacturing ducing WW II some hintigring tiesus. Was neverly damaged in 1945 (CIOS 32-38)

1945 (CIOS 3-2-38)

1) Ginster, Schlenien (Deronstors) (CIOS 32-38)

1) Ginster, Bez Magdeburg (NC, TNT med leading of bombe and theils (CIOS 32-38)

m) Hertine, bei Töplitz/Schönau (Léading of bombe and naure) (CIOS 3-3-58)

ma manes (C.C.S. 14-35) a) Herzberg, Sidhars (Londing of bombs and sines), Was completely descoyed by bombs in 1945 (CIOS o) Hessisch-Lichtenau, Bez Rasvel (Pierie seid.

TNT, oleus from spent sulfuric acid and louding of bombs and shells) (CIOS 32-48)

a) Kashing, Der Nugatorg J. mma (IV. mm. moreurs abell entrologies)
1) Kuchking, bei Ratibor (Londing of semil) bombe and abella (CIOS 32-39)
w Lawing abort, Kr. Glazz (Pyras-loading of semilantics) (CIOS 22-39)
White Company (CIOS 22-39)
White Company (CIOS 22-39) v) Melchow, bei Sanren, Mecklenburg (PETN, trialmoresonin, blasting caps, detonating lare, etc.)

(CIOS 32-38) (CICS 24-30)

w) Mainitz, Kr Sprotau, Schlesien (Loading of small bombs and shells) (CIOS 32-38)

z) Munchen, Bayen (Fuzes, such as Uhrwerk-zunder for Flak 8.8 cm Was severely damaged in 1943, 1944 and 1945 by bombs. y) Petersdorf Schlessen (Loading of small bombs and shells) (CIOS 32-38)

E.) Premnitz a/d Oder (Ammunition loading)

2.) Uckerminde, bei Stettin, Pommern (NC, NGa

ammunition loading and experimental station) ag. Wolffennameth. Des squarends, Bayers (L.A., L.Sc., Ectracence, PETN, blastrang caps. detonances and loading of some small caliber shells) Erkert & Zirgler Gobbi, Köln-Braunfeld (Explosives) (Ch.S. Rep. 3/2-8)

Egerlander Stablindustrie, Rothes (Centrifugal casting

796) Egginner Scansinguezza, nomen (Cameringue commissor of gai, tuben) (CIOS Rept 29-39) ...
79c) Fibra (mitt, Beneteld be: Bomitz (NG by con

Eichhors (Karl) Waffenfabrik, Solingen (Small, arms) Einenacher Kurosaeriefebrik Assmann Emenach (Weapons)

80b) Lisen- und Hurtenwerke Bochum, Rubr (Metallurgy) Einen-und Hustenwerk Bechum, Rubr (Metallurgy) Einenwerke A-G. Kauseralauseran (Metallurgy) Einenwerke Oberdonau. See in Austrian section Einfeld (J.-J.) Pulwer - und Pyrozechnische Fabriken GmbH. Plan at Siberhutze. Anhalt, founded in 1790, annufd black powder and warrous pyrotechniscissas, while plant as Kunigunde manuted only black powder (CiOS 32-38)

(CAOS 32-38)
Elektrochemische Tyrke, Höllriegelskoeuth (Hydragen perozide) (CIOS 23-44)
Elektrochemische Werke, Peenemände with hemocheas et Anklam, Kummersdorf, Bodenbae (Lake Constance) auf Bleichende, Haus führer ets aus guded sinnales using liquid propellants)

85) - Elektro-Nirum A - G. Rhina, bei Kleinlaufenburg, Baden (Nitric acid) (BIOS 1442, p 48). 86a) Elektro-Schmeizweite A - G. Kenpten, Aligha, Sayem

Filebro-Schmeinvener A. G. Kempton, Allgin, Bayern Monallung J. (ICS 26-73)
Menallung J. (ICS 26-73)
Menallung J. (ICS 26-73)
Firmer's G. (ICS 26-74)

mod experimental station)

III) Eumoco A. G., Laverkunen - Schlebusch (Designeth, manufacturers and users of "Eumoco" shell forging. press) (BiOS 668) Fabrik Aschau, See, item (b) under Dynamic A - G

92) Fabrik Aschau, Ste. iten (b) under Dynamir A.-G. Subsidis Aschau, Ste. iten (b) under Dynamir A.-G. Subsidis Aschau, Ste. iten (b) under Dynamir A.-G. a/d. iten (b) under Dynamir Aschauf (b) under Dynamir (b) u

95b) FEP. See Forschungsentwicklung Patente 964 Ferdiand Wicke, Wapertal - Barnes (Pyrotechnic items including amorees (BIOS Final Rept 1313)

FFA. See Flughinkforschungsnaamk FGZ, See Forschungsnaamk Gul Zeppelin

Firmenustitute were injuitations of commercial firms engaged in research, and development of rirms sagaged in research, and development of annunction, weapones, sizzurit; tunks etc. The principal firms were: Knopp, Rheimetall-Bornig, DWM-Mauser, WASAG, Bergmann and Gustloff Worke (Ref 4s, pp 77-5 & 82)

ture an, pp 7-9 & 82)
FKFS. See Ferschungsin nitut für Kraftfahrzeuge
Flugfunkforschungsan atal:
(FFA), Oherpfafferbofen, Bayem Electrical research justitute for
high frequency (Radio council for guided minsileyradar, see, (Ref 4a, p. 56).

paner, stel (Nef 4s, p / b)

793) For E - See Forachus prührung

97b) FOGEVA- Forschungsgenedlscheit für Verfahrungungben, Birkigt bei Bodenbech a/Elbu (Mysol e, Tetrusult, mosopopullent: mckets)

97c). Forschungsanstalt Graf Zeppelin (FGZ)Smrrpart/Buir

(Flight research institute) (Flight research issusure)
Home: This institute, also called LGZ(Luftforschungsaustalt Genf Zeppelin, in described in Ref 4a, 24-33 & 76

97d) Forschungsentwicklung Patente, Berlin Nuvy institution engaged in research and development of patents suitable for military application (Ref 4.

97e) Fotschungeführung (FoFu), Berlin, (Research Directorate) was a unit governing all research and development organizations relative to the Ast Porce ..

(Ref 4a, pp 71 & 73-5) 971) Forechungstastitut für Kraftfahrzeuge und Flug-

moreores, Sangare-Uncercirches (FKFS), institute for Automobile and Asecraft Motors (Ruseasch and development of various types of regimes including the closs 4-cycle type Daimier-Beas U-boar Diesel) (Clos Rept 30-76, p. ) and Ref 4a, p. 76).

(ClOS Rept 30-76, p.) and Ref 4a, p. 76)
Frang, Stock Maschinea und Werkzeugfabriken,
Berlin, iMcchinery and weapons)
Friedrich - Alfred Hinze, Rheinbausen (Mccailurgy)

(CIOS 24-16) 100) Friedrich Krupp A . G , Essen, Ruhr. One of the

world's largest organizations manufacturing guns, tenks, U-boats and other was stems. Numerous plants, among them the following:

n) Blankenburg (Metallurgy)
b) Browen (Steel works)
c) Capito und Klein Werke, Duspeldor//Beurath

(Rolling mitta) d) Essen (Home plant) (Strel works and forging)

of Essen (roose pass) (Arret works and rogang of Granowerth, Magne burg Bughan (Tanks) \* 9 (Granowerth, Magne burg Bughan (Tanks) \* 9 (Granowerth, Magne burg) \*

(Wespons) 103) Funk & Co, Suhl (Weapons) 104n) Gusweike, Frankfurt a/M (Suifuric acid) (BIOS 1645)

104b) Geba, Metallwarenfabrik, Breslau (Metallurgy). 105) Gebrüder Behler, Buderich/Hurdt, bei Düsseldorf (Steel forging) (CIOS 26-69)

106a)Geipel (B) GmbH Walfenfabrik "Erma", Erfurt (Vespons). 196b)Genschaw See Gustav Genschow

Georg von Giescheas' Esben, Magdeburg (Zinc mining and smelting, alleys, sulfunc acid) (CIOS 31-56) 108) Gewehrfnbeik H. Burgmüller & Sohne GmbH. Kreiensen.

Harz (Weapons) Gewerkschaft Victor Chemische Verke, Cierron -

109) Gewerkschaft Victor (Chroische Verke, Castrop-Rausel, Verdalen, Oliviter and, an oitseas, sys-110) Gabbl. 2sr. Verwertung Chromaches, Ezrozgaiser. See Dywassich A. G. Subvildiary. 1110 Golzen . Glimms. Maschaenbas A. G., Grimms propulates and acido). 1111 Control Victoria Control Control Victoria Control explosives, gene and ecchast (Ref. ap. p5).

explosives, gans and rocksts (Ref 4a, p 53).

12a)Graf Jappela Flight Research Institute: See
For school plant Flight Research Institute: See
12b)Grafistanes, Johannes: See
13b)Grafistanes, Johannes: Higher/Henpe (Stee)
13b)Grafistanes, Johannes: Higher/Henpe (Stee)
14b)Grafistanes, Johannes: Higher/Henpe (Stee)
14b)Grafistanes
14c)Grafistanes
14c)

115) Guntoff Verter ut Meiningen; Suhl and Weimar

119) Gusaloff Wesher at Methologica, Suhl and Bermar (Verpons).

116) Gutehoffawagahiste A - G (vorm Haniel & Lucgh, Disseldorf, Gafenberg and Stemknade (Steel foundry).

117) Huckethal Drahe and Kobleweke A G, Hannover (Wess, othles, etc.) (CIOS 33-33).

118) Hatel C. G, Faffers and Fahrraf Fabrik, Suhl (Small Mannover).

119) Hans Bons' Nachfolger, Berlin (Apparatus for bal-

120) Hann Buck, Geradetetten (Pyrotechnic items) (BIOS Final Rept 1233)

121) Honnestieche Apparathaugenelluchnit, Kiel (Appursus, instruments, semunition loading)
122) Hasenclever A -G. Disseldorf (Skell forging using

"Eilinaco" prass.

123) Hachtenberg, (H) Manchinenfabelk, Düren, Rhein-land (Imanilations, for plants manufacturing ex-plosives, ammunition and weapons)

124a) Heereswaffenamt (HWA)\* (Army Weapons Office)

Berlin, organized before WW I under famous ballietician Carl Crenz, was to charge of production, procure meat, testing and development of all Army weapons.
During ww if it became part of the Ministerium Speer (q v ) (Ministry of Armaments and War Pro-duction) named after its head. The following neganizations wase under HEA jurisdiction, Waffenant Prüfwesen, Saffenforachung Firmeninstitute, Hochachulinatitute and Waffenpeulungsstellen

124 b)Heeres Zeugamt, ingolatedt (Armed Forces Ordnance Office)
125) Heinrich Krieghoff, Waffentabrik, Suhl (Wespons, among them Luger - Pambellums and machine gun

126a) Heinrich Reining GmbH, Enger, Wentfalen - (Metallurgy, ammunition, chrome-plating of gue barrels, erc) (CIOS 32-64) 126b) Henckeis Zwillingswerk, J.S. Schneid, Solingen (Ammunicion)

(Ammunition)
127) Henschel und Sohn, Kassel transferred in 1943

127) Henschet und Sohn, Kassel transferred in 1945
to Hannorpellundes (Lecomotives, trucks and 1945)
128) Herdersche (V) Edwardsbrik, Forchheim (Explosives and propellants)
129) Hermann Göring Aeronauteal Research Institution.
Son. Luttilantforschungspansafalt

130) Hermone Giring Organization controlled several plants, such as:

s) Paul Pleigerbure und Stablwerke, Braunschweig (Steel works and weapons) b) Salsgieter (Minerals and metals) c) Wetten stedt (Shells)

(See ClOS Repts 26-86, 29-30 & 30-84)

131a) Hermann Orth, Ludwigshafen/Oggersbein, Pialz
(Mizing and kneading devices for explosives plants) 131b) Horsteller Weihrsuch, Zells Mehlis (HWZ) (Wespons)

Not interested webliquen, Zeils Menia (1742) (Wempous 1724) Hillersjeben Proving Groud was one of the Army's weapon teating stations (Welfenprikingsstellen des Herres), it tassed artillery weapon is connection with development work (Ref 4s, pp 84 & 139).

Notes were development work (Ref 4s, pp 84 & 139).

Notes in the station of Kunnersdorf was transferred in Hillersjeben is section of Kunnersdorf was transferred in Hillersjeben in section 18 Kunnersdorf was transferred in Hillersjeben in section 18 Millersjeben 18 Miller

132b) Hirsch Kupfer and Menningwerk A - G Finow/Mark (Ammunition)

(Ammunition) 133a)Hochizequena Tirguiseahl, Bochum, Ruhr (Steel foundry centrifugal casting etc) (BIOS Final Rep. 716 and CIOS Repts 29-39 & 31-46)

716 and CIOS Repra 29-36 § 34-46)
1350 inderhedinatium: (Institutes affiliated with technical colleges). These consisting of 200 stephenological and the government body of twelve technical colleges as their government body of twelve technical colleges were located at Berlin, Andrea, Bussienstein, Daniel, Winchen, Karlenber, dien, Dresien, berneit, Daniel, Winchen, Karlenber, etc., 15 dept. 200 pp. 200 p 78, 82 & 85) (See also Reichsforstnungsrat)

154) Holler (F.W.) Waffminstrik, Sollingon (Wespons)
150) Holler (F.W.) Waffminstrik, Sollingon (Wespons)
151) Holse A.G. Dotemand (Merallatgy, amot places,
projectic cases, seed carridge bases and research
156a) Huge Schneider A.G. Tauscha-Leipzig (Merallatgy,
156a) Huge Schneider A.G. Tauscha-Leipzig (Merallatgy,

copper, brass, aluminum, steet cartridge cases).
(CIOS Repts 31-54 & 31-57). At Altenberg (Anmunition)
136b)HWA, See Herzenwalfenant
136c)HWZ, See Herzteller Weihrauch

137) I G Farbenindustrie A . G , Ludwigshafen , with

numerous plants, among them:

a) Bitterfeld - Sud (Nitra; axid)

b) Elberfeld (Yarious chemicals)

c) Embgen; & Luneburg (Nitric axid)

d) Frenkfurt a Main (Fuels, lubricants and weapons)
a) Hernes Solingen, (Ruhr), vorm "GAVEG." (Nitric

f) Höcher n/Main (Nitric acid and other themicals)

a) Leverkusen bei Köln (Acids and chemicals) Lothringen Werke, Bochum - Gerthe (Nitrie acid) Maintur Verke, Fechenheim (Various chemicals) Oppsa Verke, Ludwigshafen (Metallurgy and Intermediates for explosives)
 Wolfenfarbenfahrik bei Halle (Various chemicala,

mmong them dyes used in colored smokes (See BIOS Final Repen 1232, 1442, 1633 and CIOS Repen 22-16, 23-15, 24-12, 24-21, 24-28, 24-31, 25-35, 25-2, 22-14, 27-85 & 25-14) Nese: According to BIOS Rept 1442, the LG Farbenindustrie

Near According to 2000 test 442 (C. Farkeninstrature van liquistende by the Aller Charrott Comission.

138) heating the physical recent charges on the control of the Charges of the Charg

141 b) Kabel- und Metallwerke Neumeyer A - G. Nürnberg

1416 Kanar - Vilhelm Jastitut, Berlin . Emperor William inviture (Nuclear physics to develop atomic energy as a wespon (Ref 4a, p 78)

Note: This institute existed in several branches an at Göttingen(See AVA) and Chusthai-Zelledeld(See next

142a) Kais'er Wilhelm Institut für Eisenforschung, Clauschaf-Zeilnefeld fewansamei-from Danseldorf in Sens 1943) (Ferrous mernilarry research), its branch at tirach near Scattgart was engaged in son-ferrous netal-largy research (CIOS 20-66, p.17) 142b/Kat Eichlorn Waffrennbrit, See hichborn (Katl)

143) Last Finches Apparate- and Robrie Langebau, Berim (lastalisticas for places menufacturing netrotojugase,

(Lazzilicone (er plaus menderenza avvectolicone, iermaldelych hen mentylener remaine, RNS, etc.)

1445 Kant Zeinn-Ser Zatsar (Kall)

1445 Kant Zeinn-Ser Zatsar (Kall)

1446 Kant Zeinn-Ser Zatsar (Kall)

1446 Kenner Senner Gubbt, Risenlinch, Harm (Compressed in the Compressed Compresse (CIOS 2666)

(CIOS 26-66)

149) Klucknerwerke A.-G., Cautrop/Rannel (Fuels and labricanes by Fischert-Topach process) (CIOS 25-7)

149) Klocknerwerke A.-G., Hagen/Haspe, with several places (CIOS 25-61)

150) Know-Bramse Gubit, Hayen/Egge (Strel foundry, weepount) (BIOS Final Rept 716)

151) Korheinee, Bayern.See Wasserban-Versuchsanatal: 1521 Kohle und Einen Forechungsinstitut, Doctmund (Research se coal and steel)

153a)Kola - Ronweil A - G , Berlin .- Plants at Hamm. Heisenthal, Rheinardsau and Rossahl (Military explosives and propellants) 153b) Kommadis Gesellachnit Valter, Kiel, See. Valter

Verke, Kiel 154a) Robinitro A - G , Vaduz , Lischtenstein (Instal-lations for continuous nitration of liquids such as

glyceria, sthyleneglycol, disthyleneglycol, ste by method of Schmid ) 154b) Ku er Kr. See Friedrich Krupp A -G.

155) Erieghoff Wallentsbrik, Suhl (Meapone) 156) Krosprins A - G. Immigrath (Shell lorging wains Eumero" press) 157) Krupp See Alfred Krupp, Arthur Krupp and Friedrich

Krupp 113a | Kummarydahl Proving Ground, near Berlin, was ) Kummonysbell, Proving Ground, near periin, was the main army testing station for explosives, na-manifion, artillery weapons and rockers (See also Kummonysbell West). Full scale range was maintained at Kummerndorf and there were 15 apperhaustal areas for different types of tests. The station was also provided with its own power units and wellequipped maching shops, welding shops and good shops (Ref da, pp 84 & 130-1) Note:, According to ClOS reps 31-72 (1945), p 3, some

restairs and development of small arms was conducted at Kummersdorf until these activities were transferred on Hillerslebes is 1945 on account of bombings

158b) Kummers dorf West (Assay Wanness Department Ex-perimental Station), located 17 miles south of Bellin

in the province of Brandenburg, was established about 1930 as a solid-propellane rocket development current. In mar expanded about 1932 to mended the development and tessing of liquid-propellane rocket. The first successful liquid-propellane rocket. designated as A-I (Aggregat Line), was developed at Kummeradorf West under General Walter Dormbergar. at numerators was under contests safet tomorgan.

The second toctes, A.Z., 4.5, callbers long, was
constructed in 1914 and after this it became evident
that a larger area, blum that at knownerstood these
was required, for debalgoment and iresting of liquidpropollum roleta. It was then decided to construct
another roctas center at Paenessiaded (a v)
Reference: B.Domberges, V-Z., Valung Paras, NY, (1994),

pp 23-41

159a) Kupfer-und Menningwerke E.G. Becken & Co Langen berg/Rheinland (Ammunition)

1596) Kupferwerk - ilsenberg . A - G . Harz.. (Assessation) 159c) Land- und Seekabelwerke, Küln (Cablas and various chemicals) (CIOS 25-33)

160a) Langbein - Pilanhauser Wecke A - G, Leipzig (Swel cagtridge cases) (ClOS 3)-53)
160b) L.F.A. See Luttishteforschungsanstelle blosmood

Göring
160c) LPM.
See Luftfahrsforschungsanstalt Müschen.
160c) LGZ (Luftfahrsforschungsanstalt Graf Zeppelus).

See Forschungsanstalt Graf Zappelin 161a) Lipnaga Sprungstoffmerke Gmbif with plants at: a) Kruppamihle, Oberschlessen (Industrial vapte-

saves and bissing caps)

b) Reachbustein, Schlessen (Sufery funes)
c) Schonebeck m/d Elbe, Magdeburg (TNT, PETN,

initiating explosives and compositions, demanters, intribute a reprosives and compositions, demonster shortly propellants, assignation should be a selected to the lites man to fly a glider) interested as as force treated (Ref da, pp. 78-7).

162) Lindener Züschüsches- und Pasposenfabrik A - G

1047 Linguister Lucaturers and Purpositions 1040.
Troindorf, Primar glaviers and carcerdage)
105a) Linitabritoractous granounis (LFA) streaman Gaing
E.V. Volkemonde, Bremanchewag (Arronissistical
research instrution; derendoed nous rockes, guiden
musules, rocket hele, vir.) (EIOS 27-45)

Note: According to L.E.Simos (Ref 4s, pp. 12-24 & 75), the LFA accupied as area 2% squire-miles and employed about 1200 people, it was engaged to research and develop ment of weapons, motors, surplane structures and accessife fushis. There was also as aerodynamic research issaururs, a theoretical ballattica institutes and a large range for fixing the weapons 164b) Luftfalletforschungsangetit Machen (LFM), was as

a) Laffalfatforschungsansath Machen (LFM), was an Arr Ferce research institution founded in 1942 but not completed. It included an institute for air neckline said onesployed about 200, Smillar institutes action size of the complete of the complete of the control of the complete of the complete of the control of the complete of the complete of the control of the complete of the complete of the control of the complete of the complete of the control of the complete of the complete of the Living Chapter, Francisco and Complete of the Complete of the Complete of the Complete of the Living Chapter, Francisco and Complete of the Living Chapter, Francisco and Complete of the Complete of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Complete of the Living Chapter of the Complete of the Complete of the Complete of the Living

167s)Mable (KG), Bed Cannstare, Sturtgert (Metallurgy) (CIOS 26-84)

167b) Maibach Mosomawerke, See Zeppelin Gmbil 168) Make & Vakusmerockner GmbH, Erfurt, Thuringen (Machinery, for plants manufacturing explosives propellants)

169) Manaesmann Rohrenwerke (Metallargy) (BIOS 595, p 52) Röhrenwerke, Duisburg/Huckingen

(Netzalarzy) (BISS 393), p. 2.2)

(Netzalarzy) (Piszalarzy) (Piszalarzy) (Piszalarzy)

(Piszalarzy) (Piszalarzy) (Piszalarzy) (Piszalarzy) (Piszalarzy)

(Piszalarzy) (Piszalarz

(Copper and other non-ferrous metals) (CIOS 31-35) 174) Maschmenfabrik Angaburg-Nürnberg (MAN) (Venpess and aimpred vehicles)

and amoved vehicles)
175) Maschinesfabrik, Gustav Einich, Hurdheim, Noedbuden (Mixing devices for use in explosives and propellants 176a) Maschmenfabrik Niedersachsen (MNH) GmbH, Hangoya. (Amerod vehicles) 176h) Manchingafabrik Peterson, Oldenburg Holstein

176h) Manchingefathnik Petermon, Oldenhurg Holszein (Bangha, "hides, protectioner stems, wespens van de Bernard (Color Manchinger) (Manchinger) (Manchinger) (Manchinger) (Color Manchinger) (Color Manchin

Mauser Worke A - G (Waifeniabrik Mayser), Oberndorf a/Neckar, with plants manufacturing various

located at: .

a) Berlin/Bornigwalde (Spandau plant) b) Kadasuhe

c) Köin/Ehrenfeld d) Obemdorf

e) boldeck, Bez Kassel

180) Meisener See Josef Meinsner 181a) Meppen Proving Ground . See Walfenprüfungestelle der Kriegdmanne

181b) Mers. Verke, Gebr Mers, Frenkfurt a/Main (Venpons) 182a) Metall geself schaft, Rockenheimer Anlage, Frankfurt n/Main (Sintered iron and steel components) (BIOS

Final Rept 395) 182b) Merall», Wains und Plattierwaren abrik, Hendricks-Auffrengent A.-G., Obstbassen Wappettal (Ammunition) 182c) Meen ilwaren abrik-Trauen butten Curbit at Sebasdushof

and Selection (Amountmen) 182d) Metallwarenta brik, vorm H. Wessmer A - G . Brotterode

Hessen (Ammunition) 182e) Metallwerke Fa Lange A - G at Aue/SV and Boden-

bech, Sud (Annunition)
1827) Memilwerke Sisherbörke, St Andreusberg (Assumination)
1822) Metallwerk Treuenbeitzen at Beleig and Roderhof 182h) Mecallwerk Vandhofen, Schwerte (Ammunicion)

seas MIAG. See Munion ban and Industrie A -G 183b)Miedzinnkist "GmbH, Obernhof a/d Lahm (Industrial

(asricolers) 183c Ministerium Speer, Ministry, named after its chief.

Ministerium Speet. Ministry, named siter its chief, was in charge of all German We II production, allocation of all materials and allocation of all priogities. It exerted coursel over the Ordnance Department of the Army (Herreswallenams) and of the Navy Masine (Kriegsmarine) Walferamt ] but it is not clear what relations it had with the Air Force (Luftwaife), except that the hinisterium Speer was under head of the Air Force (Ref 4s, p 68, 71 & 85)/The Ministerium Speer-exerned a considerable control over almost every government agency and coward the end of the war the Ministerium entered the management and prosecution of tesearch, it established neveral research and development institutes of ..

184) Mitteldeursche Sprengardfwerke Miedziankit Gmbll-Gouler Plant at Langelsheim (Industrial explosives) 185) MNH.See Maschinenfabrik Niedersachen Gmbll, Hunn over Möller & Schulze, Magdeburg (Machinery for chemical

and explosives industry)
Mibleobeu and Industrie A - 6 (MIAG), Braunschweig, with several plants (Metallurgy, tanks, tank destroyers, trucks, etc.) (CROS 28-46)

Munitionsanstalt Causel (Ammunition loading factory) 189) Municionamentale Hannuver (Ammunicion loading (actory) 190) Munitionsanstalt Ingolstadt, (Ammuniti-in lunding

factory) 191) Munitions an stalt Juterbog (Ammunition Italing

factory) 192) L'unitionnunstals Königsberg (Ammunition, loading (acrory)

193) Munitionnanutaltofitettin (Amounttion loading factory) 194) Munitionsument Zeithai (Ammunition loading factory)

195alNachrichten Versuchsanstnit (NVA), was an establinhment developing and penting Naval radio devices (Ref 4a, p 86) 195bNavy Proving Ground. See Waffenprüfungunteile

193c)Neufeldt und Kuhnke, Kiel (Ammunition londing) 193c)Neufeldt und Kuhnke, Kiel (Ammunition londing)

196b) Niebecker und Schumacher, leeting, Vestfale. (Amenunicion)
. 197a) Norddeutsche Affiniere , Hambuts (Sulfuric acid by

contact and Petersen tower methods) (BIOS 1641) 197b) Norddeutsche Maschinentsbrik, Britin (Wespons) 198s) Norddeutsche Sprengstoffwerke A-G, Hamburg, Plant or Quickborn (Explosives)

198bBIVA. See Nachrichten Versuchsanstalt 199) Opes A -G , Subsidiary of General Mozora), Plant at Russersheim, neur Frankfurt s/M (Motor-vehicles) 200a) Oskar Fincher Fabrik, Markdorf bei Bodennee (LakeConstance) (Pyrotechnic items)

200b) Osnabrucker Kupfer- und Drahrwerke, Osnabrück, (Yormals Seilier & Bellot), Schonebeck and Bad (Ammunition)

Salzelmen bei Magdeburg, founded in 1829 by the chemiat N. Bellot. (Bleating caps, detonament pistol, revolver, sporting and hunting ammunition)
[See Anon, 5 S 24, 271 (1929) and CiOS 32-38

Passamurde (Army Rocket Experimental Station), located on the Baltic coast, near the Peens causary and southeast of Rugen island, was wetablished about 1957 as a liquid-propellant rocket divelopment center with General Walther Dornberger in charge, The following rockets were developed and tested at Pennsminder

a) A-3 (unsuccessfully launched in 1937)
b) A-5 (successfully launched in 1939 after several previous failures)

Note: These two were experimental models. c) A-4 known now as Y-2 (Vergeltungswaffe Zwei. Revenge Weapon 2) was successfully launched in October 1942 after, some earlier failures. Its production started in the middle of 1943". d) A-9 was the winged version of A-4

e) A-9/A-10 was a two-step socker which was designed to span the distance from hurops to the

f) - A-10.

For more information about the activities at Peene-minds Defore and during by II, see:

L.E.Simon, German Research in World Was II. J. Wiley,

L.E.Simon, Comman Researchin, World Was [1,7] Wiley, NY X (1947), and A. Dornberger, V.2. Viking Frees (1954) Pp 42-63, 76, 50, 95-26, 142-5, 39-26, 200 Dornberger book, is demonstrated in the service of the seventian Clay mentioned in the service in the service of the servic smaller than the A-4 (such as the A-5 and A-5)

smaller train the A-4 (such as the A-5 and A-5).

According to L.E.Simoo! (Ref. 4a, pp. 33 & 84), the total cost of construction and equipment of Perneminder Center was about 300 million Reichsmarks and at the height of activity the Perneminde employed 2200 actentists. and technicians, exclusive of clerical and subprofessional personnel. The divisions of the Army, wafred 10 and wafred I de alvisions of the Army, were I'd and werren III (d'w) under General Domberger, were rogaged in research and development of rockets and guided missiles except those with wings, like the V-I and glide bombe. After Peenemunde was bombed, the wind tunnel and aerodynamic work was moved to Kochel, about 25 miles south of Munchen (See WVA), the theoretical sections were moved to Gamisch Partenkirchen and the manufacturing and development work was moved to Nordhausen and Bleicherode

201) Peters (1), Berlin Nv 21 (Apparatus for chemical and

201) reterm (1), Bertin Nv. 31 (Apparatus for chemical and physical tenting of explosives).
204) Pfätzische Pulverfisoris A.-u., Sankt Ingbert and Schiebusch (Arplosives and properlants).
205) Police Patroneniabnik, Wagdeburg, Arnstadt and "Grunderig (Medallic carriedges and smmunition).

206) Pommersche industrie-Verke Goabil, Barth (Pyrotechnic stems, chemical warfarr agents ammunition filling), it employed, during ww II up to 3600 workers (C.106 )2-13)

207) Pulversubrik Gebrilder Brudenbach, Junkermuhle ( | xplosives and propellants) 208a) Pulverfabrik Hasloch GmbH - See Dynamit A - G

208b) ulverinbrik Rosenheim, Stephanskirchen (Explosives and propellants)

209a) Rautkammer. Proving Ground, locaned near Lünebürger

leide, was an Army establishment for mating chamical

worfare, evenpos (Ref 4s. p. 85)
209bRechlin Testing Station (Rechlin Erprobungsstelle),
near Neugerelitz, Mecklenburg, was a proving
ground for alreafe (Ref 4s. p. 73)

ground for accreait (Ret an. p. 72)

210a) Reichsforschungsrati (State Research Council)
was the governing body of the technical institutes
(Hochschulm stitute) engaged in research work for
the Armed Forces (Ref 4a, pp. 71 & 79-80)

210b)Reichsversuchangenit für Luftfahrt, Berlin/Adlershof 210) Reschwersuchastent for Luttanin, metting/fideranor (Government reasons, center of aeronautica)
217) Rezandorf Plant. See under WASAG
212a) Reum Gewehrfeldik, Suhl; Sachara (Weapons)
212b) RFR. See Reichslotschungsrat
212b) RFR. See Reichslotschungsrat
212c) Rho erhh. See Rheimentall-Boorig A -G

213) Rheinische Dynamit Fabrik, Köln with plants at Opladen and Manafeld (Industrial axplosives) 214) Rheinische Gusmit und Cellulaid Fabrik A.G., Mannbein/Neckarau (Cellulaid, cellulaid articles and rubber articles) (CIOS 32-38)

215) Rheinische Motellwaren und Marchinenfabrik A.G., Düsseldorf. See Rheinmetall-Boras A.G., 216) Rheinischen Spritzguen. Werk GmbH, Köln/Brennsfeld

(Various items prepared by injection maiding) (CIOS 1140) 217) Rhennisch - Wentfälische Spreagstoff A - G , Berlin (Industrial explosives) #

210 Rheimendel-Gereija A.-G., Dünseldorf-Dercendorf.
Due of the Inspect seamulacemers of various machanes.
The line was founded in 1888 as the Rheimende Metallungers in Marchinerlastif A.-G., Dünseldorf, In 1879 is one part with the Waffentsheit Solothum.
In 1879 is usered with the Waffentsheit Solothum, bankrup Borsig Werfe which possessued a large well-support of the Waffentsheit Solothum.
The following Relicious archive makes of Bertin 1889 and the Solothum, the following Rheimerfall-Berning foliation were in the following Rheimerfall-Berning foliation were in the solothum to the solothum that th

a) Berlin/Maricafeld

b) Berlin/Tegel c) Bresian d) Guben e) Sommerda

f) Unterline

Note: A proving ground, called Schlausplets Unterlies was located near Celle

References: A) G.H.Chian. The Machine Con. U S Gove Princing Office. Problement. D C 11933. 9 430 S. BOOF Fried Rose 715 CI CIOS Repts 2 7-79, 31-12 & 32-108

219) Rochling - Buderus A - G . Wetzier (Centrifugal 219) Rocating of gan auben)
220) Röching Scaliwerts, Volklagen bei Saachrücken
(Seed toegiag) (CIOS 26-69) (See Röchling Projectile)

Serel loguagi ULIOS (2003) (the ascaling respective).

Rottwell A G Ser (temp) under Dynami A G

220 Ruhrchemie A - G. Oberhannen/Holem (Ritric acid) (2015 1421, p. 6).

223) Ruhrstehl A - G, with several steel works, among

a) Amenerwerke, Victor-Ames (Centrifugal conting

of gun tubes)
b) Guns-stahlwerke c) Guns-stahlwerke Versen, Gelnenkirchen

d) Henrickshilter, Harringen

s) Stahlworke Krieger, Disseldon/Oberkassel
(See BIOS Final Rept 716 and CIOS Repts 27-100, 29-26 and

79-39) 224a)Sachsische Metaliwatenfahrik, Aug Weilner, Aue/Sa

224a)Sachasache bertaisum and de Grenderfahris, Suhi was founded (Amusician) Soin Grewhefahris, Suhi was founded (224b)Sachespolat Unsettliss (Proving Ground) See also under Rheinmetal-Borsig (Av. 211b) shi basefilias

under Rheinmetall-Borsag Ave G.
Note: According to Simon (Ref. Da. p. 130) the Unterlians
attains was provided with a full-scale mage and all equipment required for conducting exterior ballistics tests. . 226) Schuckhardt A - G., Görlitz (Machinety and various 220) Schutze A -G., Oggersheim Pfalz (Machinery for manuf of chemicals, propellants and explosives)

228) Sellier & Bellot A - G See Patronen-, Zundnittelen und Mecalivaren- Fabrik 229) Selve-, Ki-abiegel - Dombeim A-G, Sommends

bes Erfort (, resilery premers and some secondary bomba) (CIOS 32 18) Stegener Dynamus Fabrik, holn, Plant at Fores

dustrial expinatives; 211) Sieglried Junghann, S., midoef, bei Stüttgurt (Meinl-

lurgy) (ClOS 26-71)
Siemana-Haluke A - G , Berlit , was one of the world's greatest electrical organizations with numerous branches and affiliated companies in Garmany and

foreign countries
Following is a partial list of Siempus planes: Following is a partial list of Schemen planess:

o) Siemens Rainitire-Werke Berlin, with planes at
Erlingen and Rudolfstadt (Electrical "quipment
such as X-Ray apparatus)

b) Siemens-Schuckert Weike A - G, Berlin (Electrical) cables and some ammonation), with branches in Wice (Austria), London (England), Ruo de Inneira

c) Stemene Wemerwerke, Berlin-Siemensundt (Dyngmos, electric motors, electrical blasting devices,ecc) (See ClOS Rept 28-31)

Note: The present was office and plant are located at

233) Skoda Verke, Pilsen. See in the Canchonlovakian BECTION

person

230 Spandes Arsanel, neaf Betlin. One of the oldest and
most important arsenfls in Europe

235MSpert Versuchmans. If it Barner-Research Establishmenty bess is fixed matterton engaged in research
for the personnel and exiting of see, muser (Red 4a, p. 6a).

235 b) Spreemerke GmbH Metall warenfabrik. Berlin/Speeden Wespous)

250 Sprogasoff Fabrikes Gobbl, Kieselbach (Explosives)
2271 Sprogasoff Fabrikes Hoppetch & -G. Köla. Phants
2272 Sprogasoff Fabrikes Hoppetch (Explosives)
2283 Sprogasoff Fabrikes And Sprogasoff Pabrikes
A -G. Pliants at Canachwita and Beatzen (Dynamites,
A-G. Pliants at Donitic Canachwita and Co. A. G., Hamburg
Plant at Donitic Canachwita and Co. A. G., Hamburg
Plant at Donitic Canachwita and Co. A. G., Hamburg
Action Co. Canachwita and Canac

Plant at Dönira (Explosives)

240) Standirbers Fornchungsnatinat für Metallchonie,
Rope Dieder Standing Standing in Metallchonie,
Rope Dieder Standing Stand

241b) Stepr-Dailder-Puck, A.-G., Werke, Soyr, Overrency, 12(1) Stepolar), Subl (Wespons) 14(2) Stepolar), Subl (Wespons) 14(2) Stepolar), Suble (Wespons) 14(2) Stepolary, Grant (Wespons) 14(2) Stepolary, Incaded on the Comments Exprobange Lübert and Rostorit was a pawars ground for transit wendom sized, 4a, 973)

244 (Technische Akademie der Luftwaffe, TAL, Berlin/Garow (Technical Academy of Air Forces) (CIOS 30-71,

pp 78-108)

Nors; According to Sianou (Ref 4a, pp 35-8 & 76-7) the TAL probably did the most advanced accessific streament in Germany; his enganization consisted of 31 inacristers; his enganization consisted of 31 inacristers; near-humination and metabolics; physics, chemistry, metariale, mostors aircraft devices, high-pressure, light mechanica, and ballistics. The Ballistic Institute of the TAL was noter the fanous hallistician Schemin, forces student and collaborator of Carl Creaz, Neutry the entire TAL (except to Bad Bankenburg, overa verament on February 1945 to Bad Bankenburg, overa the des Ballistics bestitute was noved to Ribertch, neut Ult.

435 Termins (p) A - G. (Elifectuted (Corona and word)

245) Temoting (P) A - G , Glückwudt (Corson and word pulp suitable for manufacture of NC)

146a)Theodor-Ehrlich Maschinen- and Zäharadfahrik, Goska
(Genra of all types) (CiOS 28-46, p. 18)

(Genes or an sypes) (GOO Lover, p. 246b) Torpedo Varsuchunautale (TVA) was a Maval establishment engaged in research, development and testing of torpedoes (Ref 4s, p 86)

246c)Tremonia Experimental Mine See Versuchsgrube Gmbh, Iremonia
246d:TVA. See Toppedo Versuchas qualit

247a) Udetteld, bei Gleswitt, Schlesien, was an Air Foxce proving! ground (unmed after the German flier Udet ) engaged in testing of bombs and bomb funes (Ref 4a, p 73)

247b, Unterlien Proving Ground. See Schiessplatz Unterliise

248a) VDM. See Vereinigte Deutsche Metallwerke 2480) Venus Waffenwerk, Zella Mehlis (Sespons)

249) Verministe Deutsche Metallwerke, (VDM). Sixtemetall-werke Neurod, Ettlingen, Karlsruhr (Sintered into and steel aumunition and weapon components)

250) Verenigte Leichtmenall Werke GmbH, Hannover.

(Aluminum, magnesium and their alloys) (CIOS 31-73)

251) Versuche grube GmbH, Tremonia (Experimental mine) (BIOS 1266). See in descriptive part

252) Versuchs station Heeric, Braunschweig (Rockers, socket fuels and guided missiles) (ClOS 31-13) 253) Verauchautreke Dormund/Deme (Testing gallery for coal mine explosives) (BIOS 1266) See in

descriptive pare

254) Voigtlinder and Sohn A - G. Braunschweig-Gliesmasode (Physical and optical devices) (CIOS 26-26)

255) Volkswegeswerke, mens Enlersleben (Automobiles, joeps, V-1 missile, Panzerfaust, T-Mines, 250 kg bombs, etc.). During WW II shout 17000 workers were

employed of which 4000 were foreigners (CIOS 28-46) 256a) Was See Waiten Forschungs

256b) Waffenant Prufweiten (WaPruf) (Army Wenpons Office for Developments) was in charge of research, development and testing of army weapons, annunction and explosives. The WaPnif consusted of several and depleasees. The Wal'nd consisted of several divisions of which Wal'nd ion seems in charge of iquid-fuel rockets and Wal'nd III was responsible for solid-luck rockets. The so-called Wal' (Waffer Potentus ps). Called also Forschangesbessing day Mergansifenants, was a subordiant division to the responsifenants, was a subordiant division of the control of the composition of research on all weapons in the second of research on all weapons and the exceptions of rectant (Ref 4s, PD 54-60 & 81-4)

257a)Waffenfabrik Mauser A.-G. See Mauam Werke A.-G. 257b)Waffenfabrik Solothum. See in the Swiss nection 257c)Waffen Forschungs (Waf). See under Waffenamt

259 Wideprodusgasetten der Lettwelle (Air Force Faveung Catonada were located at Rechlin, Tansewitz Faveung Catonada was been seen at Rechlin and Rechlin at Rechli

under Wattenamt Prüfwe aun

261b)Walter Wede, Kiel (Rockets, socket fuels, jet pro-pulsion, guided missiles, U-bonts, aircraft, etc) (CIOS 30-76 and 30-113) 261ct WASAG. See Westillisch-Asheltische Sprengssoff A -G

262) Wesserbso-Versochsanszalt, (WVA) Kochelsee (Research and development of long range and Flak rockets)

(CIOS 30-71)

Note: According to Simon (Ref 4a, pp 33-7 at 130-3), the Wanserbay-Versuchannealt was the cambullage name of the Cambullage and the Cambullage of the Ca

done nt WY 6. 263) Werk-zwegmanchinenfabrik Oerlikon. See Swins section. 264) Wenner-Fleiderer Maschinenfabriken, Scuttgart-Bad Canasandt, Sukutembers (Mixing and Kneading me-

chinery, gramers, etc.)

263) Westfellach-Ashelttache Sprengateff A - G, Engen (abbreviated to W A S A - G or WASAG) with plants at:

a) Coawig, Anhalt (Various explosives and propellants)

b) Elsnig, Torgat (Hexogenand nittle acid) c) Herrenwald at Allendorf, Kr Marburg, Laho (Hexanitrodiphenytemine and amountain loading)

mitrodiphenyi sampe and ammunitron linding)

d) Ona shoulet (Mixtorelisions)

d) Ress addry Sitten Get (MGu, propellants, erlet (MGu, propellants, er) Sythem, Haltern (MG and industrial replosures)

266a) Westfülische Kupfer- und Messangweite A - G. vorm

O.Nosi, Lüdenscheid/Westfalen (Ammunistion)

166b) Westfülische Metellindustrie, Lippatend (Ammuniton)

266c) Westfülische Metellindustrie, Lippatend (Ammuniton)

trial explosives) 267a) Weyers berg (P) & Co Waffenfabrik, Solingen (Weapons)

267b) NIFO. See Wirtschaftliche Forschungs GmbH 268) Wirtschaftliche Forschungs GmbH (VIFO) wie

plants st:

a) Eferbachtel bei Beiligenstadt (Fuels)
b) Embsen, ber Lüneburg- (Nittie auch research
and derelopment centur,
c) Langrisbeim, Harz (Nittie send)
(See BloS 1442, pp. 76 & 28 and ClOS 26-58)
(See BloS 1442, pp. 76 & 28 and ClOS 26-58)

269 WK Walfenstabil GmbH, Sollagen (Veapons)

WK Walfenstabil GmbH, Sollagen (Veapons)

209) Wolfenfarbenfabrik. See under IG Farbeninduntrie 270) Wolfenfarbenfabrik, See under IG Farbeninduntrie 271) Wolff & Co, Walsrode, with plants at:

a) Bomiltz (NC propellants and DEGDN solventless a) Bomitta/MC propellents and DEGDN conveniess
propellents
b) Déverdes (MC propellants)
c) Eluchburg-Bondist (MC propellants)
d) Liebequa (DEGDN propellants)
d) Liebequa (DEGDN propellants)
e) Walsworde (Black powder and MC propellants)
272) Vollmerschässer & Guth, Bestlin-Babelsburg (Starf
Vollmerschässer)

272) Wollmerschasser & Gutth, Berlin-Baselsberg (Star-hilty vesting apparatus for explosives and propellatus 273a) Württember gische Merall warenfabrik A.-G., Getalinger Steige, Guillangen (Weapons) 273b)WVA, See Wasserbau-Versuchsansfall

274a) Zeisa-Ikón A-C, Dresden (Optical, phonometrical, piezoelectrical etc devices for ballieric measurements) 274b) Zeisa (Karl), Jena (Optical instruments)

274c Zelle. A department of the Reichsluftsheministerium in charge of construction of sureraft bodies (Ref 4a,

275a)Zentrale für wissenschaftliches Berichtswessen-(ZWB) der Luftfahrtforschung des Generalisftzeug-

(Zws) der Lutrannforschung des Generalinfræup-meisters, Berdin Adlershol, (Inversion of aum-dynamic properties of glide-hombe, etc.) [See Ew.Sponder, ZwB Porschungsberich M.) 1819 (1943) "Investigation of a Laceral Scability of a (1943) "Inver

Nou: According to Simon (Ref 4a, pp 60 & 70), thh ZWB strands for "Zentralstelle-fift wissenschaftliche Berichter-sattungs" (Corner) Place for Scientific Reports), Orlinated by the DVL (Deutsche Versuchanspall), the ZWB was reported on scientific and ph is Lillestable, Geolgischeft, All to the SWB of the to the sit forces were pointed and also showned by gents of the SWB 275b)Zentrolatelle für wissenschuftlich - technische Unter-

suchungen tu Neubabelaberg bei Berlin (Government teseurch and development center for explosives, ammunition, etc) 276) Zeppelin Gobil, Friedrichshafen and its Subsidiary

Maibach Motorenwerke (Dieseis, engines, to: (See also Gest Zeppelin Forschungsinstitut) 277) Zimmermann (E), Leipzig, founded in 1887 (Devices used in ballistic measurements, such as chronographs.

278) Zunderfabrik Millheim, Ruhr und Saar (Ignitere

Tendersons Mulliaten. Ruhr und Sanr (Ignitere, 279) Zinderwerke Emst Bellar N. C. See Emst Brünn Gubbl-280) Zindikteber und Papronenfabrik, vom Sellier & Bellot. See Patronen-, Zündhürchen- u Metallwaren Fabrik 281) ZWB, See Zentmie für wissenschaftliches Berichts-

Note: Many of the war plants in occuppied Austria, Belgium Czechoslovskia, France, Holland, Poland and Russia, ware forced so work during WW II for Germany. These

plents are listed under corresponding countries. Following is a pertial list of war plants presumably operation in the Eastern Zone of Germany

A) Celluloidfubrik, Eifenburg (Chilodion cotton)

B) Chemischen Werk, Freiberg, Sachsen (Explosives

b) Committees were, Pietocia Sannass (Exposivers and properliants) (Sulface and and NG)
) Magnesit Akren, Kr Deussu, Anhalt
E) Sulckstoffwerk Pietocia (Collodion cotton)
F) VEB Chemiachen Wett (Explosivers)

VEB Sprengatuffwerke , Ganachwitz (Am nitrate, HG, commercial explosives such as "Artt", Gelatine-

NG, commercial explosives unch as "Anti", Gelatine-Dynamit, brieft yusas, etc. Schönebeck (Am uitmar, E) VEB Sprengstoffwerke, Schönebeck (Am uitmar, Amsonit, ammoniton, Baldurit, blasting capa, Chloratit, Donarit I, Donarit II, fuxes, Gelazine-Donarit, NG, NG, NG, TNT, Wester-Detonit add Donarit, NC

1) VER Walter Ulbricht, LEUNA (Rochet propellants VEB WASAG Spreagwerke, Reinsdorf (Explosives and propellante)

1 \* CO \* CONTROLL OF THE PROPERTY OF THE PROPE tetranitrate: PG Proving Ground; RDX Hexogen w (und) and; VER (Volkseigener Betrieb) People's Own Yorks; vom (vormals) formerly; WW World War.

Summary of Explosives Plants
4) O.V.Stickland, PB Rept 1820 (1945), Survey of German
Practice and Experience in Filling High-Explosives 4a) L.E.Simon, German Research in World Was II, J.Wiley. 5) G.M.Chine, The Machine Gun, Bureau of Ordenstee, U.S. Navy, U.S.Gow Princing Office, Washington, D.C., v.1 (Usclassified) (1951).

WASAG Underweter Employives. See under Unterwander arrestes or fee.

Vanorful (Vacerfall). A ground to air guided antinierraft rocket minuic developed during WV II. It was propelled by Visol/Nitrio acid (See also Guided Missiles).

1) Anon, Army Ordnance 31, 30 (1946) A.Ductocq, Les Ames Secretes Allemandes, Paris (1947), pp 110-121

3) F.Ross. Js. Guided Missiles, Lothrop, Lee, Sheppard, N Y (1951), p 37 4) Kaw. Gatland, Development of the Guided Missales, Philosophical Library, N Y (1952), pp 16:17.126

3) Gollin, CIOS Report 29-36 (1946), pp 18-24 6) Anon, Dept of the Army Technical Manual, Th 9-1985-2 (1953), pp 219-23.

Wesserstoffpermayed (Hydrogen Peroxide) See T-Scoff and in the general acction under Peroxides Wasserlastichen' Schieuspulver (Water Soluble Propellant).

Waste or Spont Acids (Abgangasaure oder Abfallanure) are described in the general section. German methods of sectivery of nitric and sulfuric acids, from waste or spent recovery of nieric and sulfunc actual, from waste or apent actual resulting from the preparation of explosives and propellent plants, paralleled the practice in the U.S.A. The procedure used at the Krümmel Fabrik for the recovery of waste acids from explosive oils (such as DEGIN) and TECUN), serving-for the purposention of 6) P.B.Sharpe, The Rifle in America, Funk & Vagnalla. N Y (1953), pp 661-3 7) V.H.B.Smith, The NRA Book of Small Arms, The Military Service Publishing Co, Harrisburg, Pennsylvanis: / v1 (1953) Pictols and Revolvers, v2 (1952) Rifles (pp 170 a

8) W. et B. Smith, Smail Arms of the World, The Military Service Publishing Co. Harrisburg, Peons (1935)

9a) Dr. M.M. Rostevich, Formerly Colonel in the Russian
laperial, Articley, Butnos Aires, Argentins; privage

communication

5b) Dr A.Stethacher, Formerly Professor at the Zildes
Polystechase institute, Switzerland; private communication.

10) Drayl, M.Adam, G.J. Shr and R. Weil and Messure: E.W. Blaszyk; J.F.Hauck, W.F.Schaufelberger, H.A. Tisch and L.G. Van Syckle of Picationy Arsenal; private communications
11) G.B. Jarrett and K.F. Kempf, Winseum, Aberdeen PG: private communications 12) CIOS, Item 22, File, 21-3 (1946), Troindorf, Fabrik, D A - G 13) ClOS, Item 2, File 24-3 (1946), Troipriori Fubrik, 14) CIOS, Item 2, File 24-4 (1946) Schlebusch Fabrik. TS) CIOS, Item 2, File 25-16 (1946), Wolfratzhausen Fabrik Dynamit A - G Subnidsory , Gmbbl zur Verweitung

of Dynamic A-5 Substitute, united the vertices of the Chemiacher Erzeugnisse
162 CIOS, Iren 2, File 26-70, (1946), Rotewell A-G
17) CIOS, Iren 2, File 27-38 (1946), Studeln and Walfingerhausen Fabriken, DA - G-18) ClOS, Rem 4 & 6. File 28-36 (1946), Elektromechanische Werke, Peeneminde

19) ClOS, Item 2, File 28-6) (1946), Kribmed, Dfineberg, and Christianstade Fabrican, D A = G (Same information as in PB Rept 925) 20) CIOS, Item 2, File 29-24 (1946), German Powder and Explosaves Plants / 21) Clos, Isem 2, File 29-28 (1946), Kaufbeuren Fabrik,

21) CIOS, Item 2, File 31-68 (1946) Dineberg Fabrik, A.-G. 22) CIOS, Item 2, 18, 19 a 21, File 31-70 (1946)Skoda Werke, Pitsen and Böhmische Walfenfahrik, Strukensta 24) ClOS, hem 2, File 32-8 (1946), Bobungen Fabrik of

Dynamit A - G Subsidiary 25) CIOS, Item 2, 3 & 8, File 32-13 (1946), Muschinen in belk Peterson, Olden burg, Holstein 26) CIOS, Item 2, File 32-38 (1946), Explosives Summary of Capacities and Production is Germany
277 ClOS, Irus 1, 4 & 5, File 32-109 (1946), Luctabe

Forschungsnasznit at Volkenrode 28) CIOS, Item 2, File 33-20 (1946), Destache Waffen and Munitions Fabrikes A - G Munitions Fabrikes A - G

29) BIOS Reports listed at the beginning of German section

Robpulvermange) (q v ) deserves so be described here briefly. The denitration was carried out on the spent acid coming from the separator in the nitrating house and from the wash water which resulted from washing the oil in the

Procedure:
Spent seeid (NNO 9, H. 50, 65, wasse. 21 & DEGDM oil
55, density 1.60) was well through a separator to remove
the settled explosive oil and then the acid was freed
ac-called destructor galaxas, henced to show 1.00 as
ac-called destructor galaxas, henced to show 1.00 as
conclient midistics of explosive oils, the waste acid was
assulfy mixed with some 50% of airtic acid before sending Nones

a) hasmuch as spent DEGDN soid decomposed maidly on someting (especially in the presence of mosaure), it was not stored for loager than a few hours, but preferably was worked up as soon as the nitration of the DEG

b) It was required that destruction of the embasive oil should be complete and that the resulting acid by light in color, if it was black, the destruction of oil was not complete and the heating had to be continued after adding some more 50% surric sold

c) For destruction of oils dissolved in with untern, was sufficient to run them through the destruction co

d) The attroug games formed in the destructor went to a condenser from which they were drawn into an absorption tower. An acid of about 40-50% atreagth, was recovered. tower. An acid of shout 40-90% strength, was recovered. The night acid collected in the condenser was bleached by bubbling at through at. This yielded white nitre acid of 38-40% attempth,

of The salfume acid which flowed from the lower end of

the destructor was conducted to a cooler from which it was too to swage tasks it contained about 71% H 50°, and the density was 1.64. No oxides of nurogen were perthe density was 1.04. No oxides of nimogen were per-masted to be present and tenta were made continuously for them with ferrous sulfage.

1) The recovered mirric acid was reheated and passed through an Austhiasor (blow-out column) where the re-

through an Austrager (alow-out column) where the re-maining situages unides were removed by a stream of air. The acid then passed through a syphon into an intra-medianc containtr from which it was sent to a storage conk, Reference: Scietland, PB Rept 925, (1945), p 62.

Womans. See Tuble 63 and illustrations on the following Weapons. See Section of webpons were obtained from the fallowing sources: Museum of Aberdere Proving Ground Cut antility weapons and some of small arms), Reference 9 periods and difference of the section of the secti

pincole and rilles).

The suctors wish to express their apperclation to hierass [18, ]arcet. K.F.Keneri. H.M.Reed, G.M.Chinn and V.H.B.Sauth for use of material listed above. References (Venpons ):

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for this work, ...
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10) W.H.B. Smith, The NRA Book of Small Arms, Military Service Publishing Co, Harrisburg, Penns, v. 1. Pincols and Revolvers (1953) and vol. 2. Rifles (1952) 13 V.H.B. Smith, Smith Arms of the World Military Selvice Publishing Co. Ilarriaburg Penna (1955) (Gives also an historical description of the development of German

reall area) Fig. 1. 12) Col. J.B. Jazzett, and Mesons K.F.Kempf and H.M.Reed of Museum Abendeen Proving Ground, Maryland; private communication
13) J.E.Capell, A.B.Schilling (a Coghlan and B.H.Bullock

of Picatinay Amenal, Dover, New Jersey; private con-munication (1955).

Note: An historical description of the development of As historical description of the development of German artillery weapons may be found in the book by Capt Junes E Hicks, "Notes on Gernem Ordenace 1841-1818," 428 Rick Ave, ht Vermon, N.Y. 14) P. B.Sharye, Rifle in America, Fruk & Wagnelle, NY (1953). 15) Anon, Intelligence Bulletias Tashington D C, (1955). Note: These bulletins were not used as nources of information for this work.

Weapons, Internal Bullistic Data off, H.M.Pike given, at the end of CIOS Report 31-68 (1945), several tables listing one con or UND report 31-00 (1993), several babbe listing forman weapons from 20 mm; to 300 mm, the types of pro-pellants used by three, size of grains, weight of charge, type and weight of projection, fough and tapacity of chamber, shot pravel, foral capacity, preasure and muzzle velocity.

"Weissmann" Zünder, Pressure type igniter designed for use in improvised mines (as a push igniter) or in some HE charges (as an impact igniter). See also under improv.

Weisspulver, See Ranchig's White Powdet.

Weise-Salz (White Salz), A compound, (HgC:N.SO\_R), produced in 1944 by the IG Farbenindustrie at Höchet am produced in 1946 by the IG Farbenindustrie at Hoches as Main, as an intermediate in the manufactors of Hanopea. The compound was silipped to me Nobel plant as Hamburg, and the second of the compound was silipped to me Nobel plant as Hamburg, anopped as soon as the method of direct to the safe was proper as soon as the method of direct to make anopped as soon as the method of direct to make the second of the safe was prepared as follows: a more prenounciant. Neinz-Safe was prepared as follows: a second of the safe was prepared as follows: A second of the safe was prepared as follows: A second of the safe was prepared as follows: A second of the safe was prepared to give the same safe of the safe was prepared to the safe was safe was

b) On treating it with KOH, the corresponding possessium be made any size c) On treating the K sait with formsidebyde the Wains-

Reference: R.E.Richardson et al. CiOS Rept 25-18 (1945), a 28-70.

Pearfeilt Westphalin). A series of explosives proposed by Biclickich in 1995. The original composition continued Am airmen 99 and resis 5%, it was large modified to the ope containing Am airmen 91, K nitrate 4 and resis 5%, its vaciously of demonation, and 4350 Agreet steeming 15%, its vaciously of demonation are 4350 Agreet steeming 15%, Coal Westphalitri (Ref) and the containt in Kohle (Coal Westphalitri (Ref) and the containt in Kohle (Coal Westphalitri (Ref) was a series of the proposation and to the series of the proposation and to the series 50 Sprangmant of the composation of the them 3 to 35 of chromism and to net as cooling agents. Some Westphalins were semiforced in England.

References:

1) Daniel, Dictionnaire (1902), pp 804-6 2) Marshall Explosives v 1 (1917), p 389 3) Barnett, Explosives (1919), p 113.

Wosmhalite. See Westfalit.

WETTERSPRENGSTOPPE (Explosives Safe for Use in the Presence of Finedans), A series of coal mining explosives approximately compapedding to Americas Permissible Explosives or French Explosits antigramment Table 64 lists these explosives (See pp 260-61).

WEAPONS (Waifen) may be subdivided into:
A, Small Arms (Handfacewaifen), which indicided:
A, Small Arms (Handfacewaifen), which indicided:
A, Small Arms (Handfacewaifen), which indicided:
A, Small Arms (Macchinengerweil) and submachine gus (Maschineng-gole) models
B, Artillary Pieces (Grachutze, which include:
caanon (Kanone), howitzes (Haubston) and nortis;
(Affens) howitzes (Haubston) and nortis;

C. Rocket Launchere (Raketenwurfmaschinen), which includer Faustparroce, Punzerfaust. Pauserachteck (Raketenpauser-büchze 54), Püppchen (Raketenwerfer 43) and others, Mont of the Carman weapons used in WW 1 and 11 may be found on display in the Museum of Abredoon Proving fround, Varyland.

Fable 53, following, given some of the characteristics of German small arms, artillery picces and rocket launthers.

	Yable 63 (Wespens)	
€sliber and Demgosmon -	Remarks, Uses and Some Characteristics	References
6,35 mm (,250°) Manag Automatic Piatol M 1910, called Westmachenpiatole (WTP), Vyst Pocket Piatol	Longth: bazel 2.03° and overall 4.06°; to 10.22 on and a capacity of 6 rounds. One of the best small pistols ever produced	2, p 321; 4, pp 275- 8 at 10, v1, pp 141 at 560
6,35 mm. Valther Pierola Modela I (1908) and 2 (1919)	Blowback vest pocket pistol's using 25 CAC	11. p 479
6,35 mm Walther Pintol's Models 5 (1913). 8 (1920) and 9 (1921)	Streamlined versions of above piacols	11, p 478 & Ref 12
6.35 mm Piscoln: Bergmann, Origion, Sauer and others	Can be seen at the Museum of Aberdeen Proving Ground, Md	12
6.5 mm (.256°) Bergums Astometic Pistul	One of the andiese small nine pissots	7, p 27
5.5 mm Manage Vent Pocket Automatic Pintole, Types WTP I (1910) and WTP II (1919)	Elementary blowback plants sesenbling the Browning types. The Type II was the abramined version of Type I	11, p 485
<ol> <li>6.) san Saver &amp; Sohn Vest Pocket Pistols, Types 1 and 1A</li> </ol>	Resembled a Browning in external ap- pearance Capacity 7	11, p 484
7.63 mm (.300°) Military Mauser Automazic, Fis pl, called Maschinen Piscolar de- reloped in 1895 and used dusing WW I Note: According to Ref S, 4 I, p 177 there, we	Recoil-operated pissol weighing 43 on. Capacity 10. Could be fired with shoulder succh holater attached as also as improved model (1419 26) of the above pissod	2, p 321; 4, pp 275- 8; 7, p 27; 10, v1, pp 167-176, at 11 pp 464-8
7,6) mm Manner Machine Platol M 1937, called Schnell-Freer Platole (Rapid-Pire Platol is sweet to SS troops. Was also manufel in Spain under the name of ASTRA	Recoil-operated weapon which may be considered as intermediate between the pietoi and the submachine gam. Longto of barrel 5%, oversit 12, u 45 0a, espacity 10 or 12 cartridges, ma vel up to 1500 ft/ sec	8, v1, p 177 & 11, pp 469-7 i
7.65 mm (.301*) Automatic Pissol, intro- duced in Germany in 1893 by an American Hugo Borchardt	Counidated as the foremaner of the Lugar. Could use 7:65 mm Manner accountion.	7, p 27 a 10, v1, p 185
7,63 sam binanticher Pizzot invented in 1900	Was also made in caliber 7.63 mm	7, p 27
7.65 mm Lager (Pacabellium) Piacola M 1900 and M 1900/06 were used during FW 1. Model 1900 was as official Swiss pintol	Barrel langth 41%. Used carridges coats 10 gr of modeless prop and a bullet weighing 93 gc. Mx vs. 1250 fc/sec	2, p 320; 3, p 187; 7, p 27 at 10, v1, p 182
	rigioal Luger was designed by an American, Borchardt, a er in en ame of "Borcharde Leuger" and later corrupted as ", which literally means in Lano "for war", in need in Eu	
7.61 mm Luger Automatic Carbine (Parabellum Kurabines)	It consisted of a regular Lugar plant) provided which a detachable wood suck and a long barrel with a checkered wooden forward	10, v1, p 184
7.65 mm Duryse Automatic Plant M 1907	Ble whosehunts the prumi weighing 24 exceptive B	10, v1, pp 233-5 at 582 at Ref 12
7,63 mm Beholls Ausomatic Piscol manufol by Becker & Hollinder, Suhi	Blowback-action prated wighing on 22 or. * Was used during both WWs. Capacity 7	10, v1, pp 218 & 579
".55 mm DWM Automatic Pistor, manuald by the Deutsche Walfen- u Manationsfabraken	Blowback-action pistol weighing 20% oz. Capacity 7	10, v1, pp 235-6
7.63 mm Automatic PismI invented by F.L. angenham of Suhi and called F.L. Selbut adet (F.L. Selbut adet)	Blowback-action piacol weighing 22.9 oz., capacity 8. Van used dogog WV 1 as a substruct officer's piacol	10, v1, pp 243-5 & 585
7.63 mm Automatic Pistol, called PB Special Model III, masuid by A. Menz, Suhl	Double-action blowback prami which closely resembled Valchaid PK	10, v1, pp 253-4 & 788
7.05 nm Ortgies Auromatic Piscol (manufd by the Deutsche Wedge, Erfun)	Smk er-fired blowback pages!	10, v1, pp 254-6
7.65 mm Jág≁r Austrauetic Pisati	A blo wheck-operated piscol of simple and most usuanal design	10, v1, pp 248-3 & 585 & Ref 12
7.65 mm Mauser Automatic Focker Platel N 1910	A straight blowback-action piscol weighing 21.5 oz. Capacity, 9	10, v 1, pp 246-9 & 587



PICATINNY ARSENAL TECHNICAL REPORT NO. 2510

# DICTIONARY OF EXPLOSIVES, AMMUNITION AND WEAPONS

(GERMAN SECTION)

BASIL T. FEDOROFF

IENRY A. AARONSON GEGRGE D. CLIFT EARL F. REESS

DOVER, NEW JERSEY



	Ger 229	
	(Wespens) (cont'd)	•
aliber and Designation	Romarks, Uses and Some Characteristics	References
7.65 nm Manuer Automatic Platol, HSc (Hammer-Sal-loading)	Double-action blowback pietol, length barrel 3 3/8- and overall 65/4. Wt 20.6 on and capacity 8 carridges, either 7.65 mm Browning ox 32 CAP	10, v1, pp 246-9 a: 587 & 11, pp 472-3
7.65 mm Rheinmerall Ausonomic Piatel	No whark-operated pistol weighing 23.6 on	10, v 1, pp 254-6
7.65 mm Roth-Sauer Assumatic Pissal Sum numerable similar to the Austro- Hungains Roth-Sauer pissals	Long recoil operated weapon weighing 23 oz with capacity 7 cartridges, caliber 301	10, v1, pp 208-9 at 11, p 483
7.65 mm Sever Automotic e Twish M. 1908 manufel by J.P.Sauer & Sohn, Suhi	was replaced after WW I by M 1930 and and M 1958	10, v1, pp 258, 260-1 à 590
7.65 mm Souge Automatic Pietola M 1913 and Behördenmodell (Authority Model)	Blowbach operated weapons, apacity 7.  The Behoods amount was widely used by military and police official's	11, p 465
7.65 mm Secot Austrasic Pianel M 1930	Streamlined modification of earlier models	10, v1, p 259
7.65 mm Sauce Double Action Assomatic Pissol M 1930 (called also blodel H) was wately used during WW II by the German air and teak forces. Considered one of the world's jour pocket pissols	Singlight blowback action weapon. Length of harrel 3½° and overall 6½°, 8t 22 on, espacity 8 careridges either 7.65 am Browning or .32 CAP -	10, v 1, pp 279-& 262-4 and 11, pp 474-7
7.65 mm Walther Pistole Models 3 (1909), 5(1910), 6 and 7 (1917), manufe by K.Walther of Zella Mohila	Blowinch-action, wendons using , 32 CAP contridges	10, v1, pp. 206-7 at 194 at 11, p. 478
7,65 mm Vaither Pined PP (Polism * Piseole), latto-deced in 1921	Valuter type plant widely used by police forces then given Bumps.	10, v 1, pp 286-7 a 11, p 478
7.55 mm Walther Pistol PPE (Policel Pistole Eriminal/introduced in 1929 and menuted in great numbers.	Designed for detectives who corresponds transpond concealed	10,v1, pp286-92; 32; p-478 & Ref12
7.9 nm (.311*) Riffs M 1388 Gewint Ed. niberwineed in Get 68) Gewint Ed. niberwineed in Get 68) Gewint Ed. R. Combined in making the combined in the	Prototype of Austrillas need in both WW The East 500,000 sides to the State of Libert of the Bells of the State of the Mildly shouse and lighter than the rills. Both of them used rimmed acched, create-fire carridges with much soce builters.	10, v 2, pp 201-15; 21, pp 425-7 and Rel 10
92 mm (.3129 Manner Rifle M1894 Gruebs 99); Bolt Action, was the timhand German Infancy Rifle of FF I and the early form of all modern dameer if Ren. Served as prometype or military if Ren of many Entopean	Lingth of barrel 30.19 and ownell (without beyond) 49.25, we 91.5 hackpairing 9 dep- lares, necked,conservaire carridges with polaced builder (Spinzer), blue 196 875 m/sec (2007 for sec) and pressure 3.000 am (3133) pail	4, pp 63-90; 10, v 2, pp 171 at 215; 11, pp 427-0 and Ref 1
total Criganally Gree 98 aned a sound accord- ulter. In order to take the new bullet it was	buller (some as in M 1888) which had a slightly smaller of necessity to college the disas of Gow 98	lium than the pointed
.97 ma Muser Carbine 1896 (Karibinet	Caralty version of Gew 98. Beetyl longth 18"	11, p 428
6, abbe to Kar 96) - Original medal 92 mas Managet Carbing 1898 which	A Committee of the Comm	4 to 85 40; 10,
37 ms Mutaet Carbine 1898 wach as introduced in 1904 and adopted a 1908 for use by antilley and againer (pronue) personne	Curdows version of Gew 98, Longth of barrel 24' and oversil 43.3'; wc 8.2 lb; expensy 5	v2, pp 171-5; and 11, p 428
.92 ms Kar-98s was isturdeded for VV l by me Reichswehr	Slightly modified version of Kar 98. Was used in WW II	10, v 2, pp 171 & 177 & 11, p 429
92 mm Kitz-98b, developed after WI by the Reichswehr for cavalry ad accord forces use	It differed from Kas 98 in having a home down bolt handle and side aling. Was used during WV II	10, v 2, pp 171 & 177 med 11, p 429
.92 mm Karabiner 98 h (Kb-98h)	Can be seen as the Maneum of Aberdeen Proving Ground, Md	- 12 ' · ·

Can be seen at the Measure of Apardems Proving Ground, Md

Slightly modified version of Gew 98 designer to permit operating up manuf by reducing machine operations

Was provided with magazines of 5, 10 and 25 tound capacities

Short recoal - specaced, water-cooled MG used during WV 1. Wt 40.5 lb with food

manufe at Spandau Arsenal, was called Spandau Machine Gon

A lighter version of MG 08, which weighed 30 and 31 lb. Ips air-cooled version,

12

, 10, v 2, pp 175-6

10, w 2, pp 176-7

8, v 1, pp 309 at 662

8 v 1, pp 309 & 314; 11, pp 517-20 and Rel 12

7.92 mm Semi-Automatic Rifle, Model 1915

7.92 nm Gewehr 98/17, developed during WV I and discarded after it

7.92 mm Grwehr 18, developed alter WW1 so an experimental model

7.92 mm Machine Gum M 1908/15 (MG-08/15) Maxim

7.92 mm Machine Gus M 1908 (MG-08)





mus vel 2750 ft/sec. It was a modification of

the MG-34, designed for flexible mounting

Can be seen at the Museum of Aberdeen Proving Ground, Md

Ensentially the Mannlich or Schönener

turn bole rifle equiped with a Manner type magnine. Overall length 43.5", berrel 24", we 9 lb

Same as above

Same as above

CELIDEL WEG DANS BRECOM
1.92 mm Bergmann Machine Gua
M 1910 was invented prior to 1900 and improved in 1903 and 1910
7.92 mm Dreyse Mechine Gun

M 1912 was invented to 1907 "me" The second second " THEF .F . 100 Oleven, the inventor of the headle yes

7.52 mm Drey se Machine Gun, called MG-13 7.92 nm Parabettum Light Machine Gun M 1913, manuald by DWM and

u sed during WV 1 7.92 nm Bergmann Aircraft Machine Gunn M 1915 and M 1915 NA (New Pattern) were used during WW I · 7,92 mm Gaut Double-Bazrel Aircraft · Machine Gun M 1918

7,92 mm Soloshucz Muchine Gon 16 1929 -

7,92 mm Solochum Machine Gua M 1930

"Was Aircraft Machine Gua. of Marshan 242 under the name (NG-15)

7.92 mm Aircraft meaning adopted before WV II under un of Maschines gowehr 17 (MG-17)

7.92 mm Manner Carbine M 1898, Short (Kambiner 98 Kura, abbr to Kar-98K or Kb-98K), mass produced beginning 1935. Was the principal military small arm used during WW IL. Its essential difference from Gew 98 was in the improved tolt alveve, sights and shorter barrel

7.92 was Greande Rifle (Launcher Gernade) (Modification of Karabia er 98 K)

7.92 mm Knorr-Brens é Machine Guns M 1933 and M 1935/36 were developed by H.L. auf of the Know-Same Manuis Co, Lichtenberg

7,92 mm Mauser Light Muchine
Gun, called MG-34, was developed
about 1934 at the Manner Plant and
became the standard MG of the German Amy

7.92 mm Light Machine Guse MG-34 (Modified MG-34s and HG-34/411

197 mm Light Machine Gun MG81, developed in 1938 at the Manner plant (Aircraft Model)

7.92 mm Light Machine Gun MG-81, ground une 3 192 mm Aircraft Machine Gen, Nodel 39 (Kriegholf) 7.72 mm Antitank Riflen PaB-38, PaB-39 and PaB-40 (Kfreghoff) 7.92 mm Gewehr 98/40 (Modification of the Hungarian Service Rufle

041 171	
(Wespons) (cont'd)	
Remarks, Uses and Some Charactenssics	Reference
Short recoil-operated, water-cooled MG weighing (with feed) 36 lb	8, v1, pp 214-16 m 652.
encoder over 57.5 th. Vas used a	· Buy しつま おでは bod & Ref 12
•	.*
Air-cooled MG. secretely manufd after VVI my violation of Versailles treaty	8, v 1, pp 367-70 and Ref 12
Short recoil operated, sir-cooled MG weighing (with feed) 22.1b	2, p 314; 8, v 1, pp 310-13 m 662 and Ref 12
Short recoil-operated, air-cooled MGe weighing 36 lb (with feed)	2, p 315; 8, v 1, pp 365-7 & 65s and Ref 12
Recoil and gas necessard, nirrecoiled MG weighing 60 lb, it was necestaly manufil after WW !	8, v I, p 379
Short recoil-operated, air-cooled MG weighing only 17 lb	8, v I, pp 453 at .
Short recoil operated, sin-cooled MG weighing 18,5 ib	8, V1, pp 453-4; # 664
Show recoil-operated, air-cooled MG weighing 27% in	8, v I, pp 445 & 662
An improved version of MG-15. We (with lead) 27% lb	8, v 1, pp 455-6 a: 662
Length or summary appropriate and length or the summary appropriate between 0.45. No summary appropriate property of the summary appropriate appropriate property of the summary appropriate to a summary appropriate to a summary appropriate to a summary appropriate appropriate property of an appropriate property of a summary appropriate property of the summary appropriate property of the summary appropriate property appropriate	10, v 2, pp 170, 274 a 179; 11, pp 422, 429-30 and Rel 12
Can be seen at the binseum of Aberdeen Proving Ground, Md	Ω , ,
Gas-operated sir-cooled MGs. The latest model weighed 18% lb (with feed)	A, v 1, pp'469-71, & 660,
Short jucoil operated, air-cooled MG weighing 24% by (with feed). Barrel Tags th 25% musr set ca. 2750 fe/ sec; ness of five 750-800 r/m and sauger 5000 yd	6, v 1, pp 472-4 a: 662; 11, pp 503-6 and Ref 12
Slightly modified versions of MG-34	8, v 1, pp 475-7
Recoil-aperated and air-cooled, Wt (with feed) 13's 15, rate of fire 1200-1300 spec and	8, v1, pp 478-9 at 662

12

12

12

11, p 430 and Ref 12



# (Wessess) (cont'd)

	(Wespens) (cont'd)	
Caliber and Designation	Remarks, Uses and Some Characteristics	References
7,92 mm Gewehr 33/40 (Modificacio of Czech Model 33)	h' Short weapon (barrel 18*) used by mountain and ski troops	11, p 430 and Ref 12
7.92 mm Gewebs 98/49 and 29/40 Magner	Cas be seen at the Museum of Aberdeen Proving Ground, Md	12
7,92 mm Antitanie Rifle, Model 55-4		12
7.92 mm Semi-Automatic Rifle Model (1-M (Hulbautomatischen Gewihr 41-M) developed at Mouser plant	Gas-operated weapon which did not prove to be successful in field une	10, v 2, pp 187-8 a 11, pp 452 at 438 and Ref 12
7.92 mm Semi-Automatic Rifles Gew-41 (G-41) and its improved version G-41W were designed by Waither	Experimental gravopenting wespons incorporating none features found in pre- WW II Runsian Degratev, Simonov and Tokares weapons	4, pp 111-13; 10, v2, pp 180-9; 11, pp 432-7 & Red 12.
7.92 mm Some-Automanc Refle M 1943 (Gene-43) and Carbine M 1943 (Exe-43) were developed during WW II in order to do away wit some defects of G-41 and G-41W persons	These weapons were gas operated and the action was of the estaght-line (some-questing) but type. Characteristics of Gaw 45: overall length 44.5°, barrel 2.7°, vt. 8.9°, and ongazine capacity. 10 cartridges from two blauser 5-round clips.	10, v 2, pp 189-197 at 11, pp 439-43
7.92 mm Automatic Rifle, M 1942 (Light Machine Con), called Fallechemidger Geweht 42 (Pana- trooper's Rifle 42), abbr to FG-62. It was fitted with a folding hipod mount.	Gas-operated, air-coaled weapon of revu- lationary design. Overall length (without beyone) on 4.7, burrel on 19 and we 9% lb (without magazine), big gaunose straight box inserved on the 16th side	4. pp 176-79; fl, v 1, p 499-91; 11, p 444 and Ref 12
	se H.Kriegholf Veffeninbrik, Suhl. It was also made in the	U.S.A. under the designation
7.92 mm Automatic Rifle, M 1942, Modified	Can be seen at the Museum of Absolute Proving Ground, Mr.	, 12 *
7.9.2 mm Light Machine Gun, MG-42 was the latest Gamun, machine weapon of WW II and the most remarkable gun of its type ever produced in any coming of the world. MG-42 incorporated the best fentuam of previous Runniam and German MG-	Short recoil-operated, sir-cooled MG weighing 24 lb (with feed). Rate of fire 1200-1330 pm and max vel 2570 ft/sec.	4.pp 176-9:8, v1, pp 484-8 & 662:11, pp 509-16 & Ref 12
7.92 mm Machine Carbine (Maschines karabines, abbr to MEh-42)	The used on the Russian front, its improved version appeared in 1945 on the Western front under the designation MP-45, it was practically identical with MP-44 described below	11, pp 300 and 502
7.92 mm Machine Carbines MKb-62 (H) and MKb-62(W), Called also Submachine Guns	Can be seen at the Museum of Aberdane Proving Ground, Md	12
7.92 mm Carbine 1945, Kb-43	Same as above	
7.92 nm Mechine Pistol M 1944 (Manchinespistole 44), was originally developed in 1942 and then introved in 1945. On Hitler's order it was called Stumgeresh 44 (StuG-44)	Gas-ope meed sir-cooled weapon of semacha- ble design and manual. It was practically identical with orchisorphisms 63 (467-5) and Karahiner Ed. Overall lengths jobs, barrel of 167-69. Overall lengths in a consideration of the consideration of the con- cept of the consideration of the con- cept of the consideration of the con- tractions of the con-	12 11, pp 499-501 and Ref 12
Note: The carridge used in the latest version of the standard bords-sack to and good accumely was obtained at ag cs 650 yd) (Ref 11, p 502)	7,92 mm respons, such as machine carbines and machine le carridge using a 125 gmis pointed bullet. Muxile veloc affective range of at least 400 yd. (The Germans claimed	pintoln, was a cut-down ity was on 2250 tr/sec as affective range of
sturm Gerwit I, abbe to VG-1), manual by K. Walther, Suhl	Short, turn bolt action rifle, meanful with the intention of innuing it to civilines for home delense. Overall length 43°, barrel 23.2°, wt 8.3 ib and negazame capacity 10	10, v 2, pp 181-3; 11, p 451 and Ref 12
7.92 mm People's Rifle Special (Short) was developed in 1942 by Hinal of Suhl and introduced in 1949.	Weapon of very original design and of great amplicity. Overall length 34.9°, barrel 14.9°, wt 9.4 lb and magazine capacity 30	10, v2, pp 198-9 & 11, pp 445-7
8 mm (.31%) Schwarziose Machine Gub M 1907/12 invented by A W. Schwarziose of Germany and first manufe by the Steyr Arms Works in Austria	Operated by retarded blow-back and cooled by water 1971 46% lb., must vel 1875 ft/sec and rate of fire 400-450 spon	8, v1, pp 228-31

# WEAPONS



# (Weepens) (cont'd)

Caliber and Designation	Remarks, Usen and Some Characteristics .	References . *
9 mm (.354") Lugar (Parabellus) Automatic Pistols Models 1902, 1902/06, 1904 and 1904/06 (M 02, M 02/06, M 04 and M 04/06)	Barrel lengths; 4" for M 0.2 & M 0.2/06 and 6" for M 0.4 and M 0.4/06. The last of the M 0.4 and M 0.4/06. The last of the most of the modern than the bolster attackfrom the modern than the M 0.4 was as official German New yearpon and during WW 1	4,pp 271-3; 10, v1,pp 182 a 417-18 and Ref (2
See also Note given under 7.65 mm 1. ug	et (Perabellum) Pintol's M 1900 and 1900 and 1900/06]	
9 mm Luger (Pansbellum) Aucomatic Fisch Model 1908 (Official German Amy Weapon of both WWs). It was alightly modified in 1920	Recoil-operated, Lengths; barrel 4º and overal 8½; wt 30 oz, magazine capecity 8 curreliges with round or flar point ballets weighing 110 and 125 genins. Mux wel 1040	10, v I, pp 182 at 418-19; 11, pp 456- 63 and Ref 12
		called 9 mm Pambellum
9 mm Mauner Antomatic Piscol, Mutary Model, also called Machinesopiatais, Used in WW I and so a limited extent in WW II	Same design as 7.63 mm Mauser, Magazine capacity 10 Luger curtxidges, Could be fired with shoulder smock holseer artisched to magazine	4, pp 275-8; 10, v I, p 420 and Ref 12
9 was Sergmann Automatic Pistol M 1910 was massid for the Greek Army, There was also a Model 18-1	Similar in nine and design to the Belgian 9 am Bergmann-Beyard except that it was lighter (32 on)	-10, v 1, pp 439-41; 11, p 491 and Ref 12
9 wm Bergmann Automatic Pintal (Machinespistole) M 1984, called slao Submachine Gun	- Medification of Model 18-1	11,pp 491-2 and Ref 12
Note: This weepon was officially adopted	by Sweden in 1937 and for this reason is beiefly described	I in the Smedish exerting
Invested prior to WW [	Recoil-operated; magazine capacity  8 tounds	2, p 322
9 mm Steve-Suicthura Automatic « Pienti (Mauchae spinnole) (MP), called in the U.S. A. Submachine Gun and in G. Britain Machine Carbine. Also designated as \$1-100	Operated by recoil on the blowback principle. Oversil length 322; wt 9%lbs; magazine capacity 30 Pambellum entridgen. Max vel 1300 to 1600 ft/sec	4, pp 246-8; 11, pp 496-7 and Ref 12
9 mm Walther Automatic Piatel, invented before WW [	Blowback-operand. Served as the prototype for later models. Capacity 8	2, p 322
9 mm Walther Automatic Pierol, originally introduced as Model HR was officially designated as P-38. This model was called Walther Annee Pierole' was	Operated by short recoil, Length barred 4% and overall 8%; at 36 or; magazine	2, p 322; 4, pp 278- 80; 10, v 1, pp 425- 32; 11, pp 450-55 and Ref 12
9 mm Schmesseer Machine Piatol,	Will and it was entensively used by the Amed Forces	
N Page 11	Blowback-operated Length barrel 7.29 and overall 31.6°; wt 9 lb; capacity 32 Pambellum cartridges	11, p 495 and Ref 12
9 mm Schmeiseer Muschinen Pierols 38 (MP-38), called in the USA Sub- machine Gan, Purachuse Model	Operated by blowback. Overall length (with asock extended   35°; wt (without magazine) 9 lb. Magazine capacity 32 Parabellum cartifiges	11, pp 426-9 md Ref 12
9 mm Submachine Gan, MP-34/1, Bergmann	Can be seen as the Museum of Aberdens Proving Ground, Md	12
9 mm Machine Carbine, 16-35/1 9 mm Schmeinner Maschinen Piscole	Same as above	12
Gun and Surp Gun	Slight modification of MP-38; same dimensions. Cyclic case of fire 500 spm	4, pp 24a-50; 7 p 37; 11 p 490 and Ref t
9 am Auconous Smwning Pintol, M 1935, designed 10 years earlier by J.M. Browning. Was need during WW II by SS troops	Recoil-operated; length: barrol of and overall 7%; we 35 our capacity 13	und Ref 1 10, v 1, pp 404-
9 mm Dreyse Automatic Pintol, Mil xary Model	One of the endiest blowback operated pratols, manufed in the closing years of ww ?	10, v 1, pp 408-
9 mm Erms Machine Pistol, sometimes called the Schmetsser Machine Pistol or Carbine	Overall laugh 33%, we 9 lb and cyclic rare of the 120 pm	10 11, p 493
9 mm Leuhausen Machine Pistol		· -
9 mm Submachine Conn. Euro	Capacity 40 carrindges; we of piacol 91h Zou	11, p 494
and EMP-44 . 10.15 mm (.40°) Norwegian Rifle ,	Can be seen at the Museum of Aberdoon Paying Ground, Md	12
	Used Norwegian ball name, type 522	Suja
		£ .

# WEAPONS (SUBMACHINE GUNS AND MACHINE GUNS)



Caliber	and	Designatio

# 11 mm (.433") Single Shot Rifle Maiser M 1871 (Gewehr 71)

# (Waccons) (cont'd)

Remarks, Uses and Some Characteristics	
Tumbolt action; the first metallic cantridge breechloader officially adopted in Germany	

References

10, v 2, pp 200 & 204

8, v l, p 553

Ve uthout by cose 10.3 lb. lt used black powder.

We uthout by cose 10.3 lb. lt used black powder.

Needle Gon (Zindasselgarechn) invented in 13% by a guasatth Nicolas von Devyse (1787-1867) and officially adopted at 1842. The Life was the world a first successful tumbols action barechiosette, in the ungerved from at various executably in the wast of 1866 (against the Austrians) and in 1830-71 (against the French). It fired a coascal bullet References; a) W. (Creener, The generalized carriedge together with a change of black powder.

References; a) W. (Creener, The Gondon of the Coastant Co

No characteristics given

· o) recletobades Distantica'
11 mm Rifle Model 1884 (Gewehr 84) was developed by Mauset and a German Army Commission
11 ma Revolver, Gemma Service M 1880. Although obsolescent it was used by the Amed Forces as late as WV 11
11 mm French Parabellum Piami
11 mm French Rifle 1879/83
12.7 mm (.50°) Maxim Machine Gun Yu F (Task und Flieger) for use in tasks and streatt. One of the secret weapons of WW1. About 6000 were produced in 1918 but none was used in combat.
13 mm (.512") Tuff-binuser A/T Machine Gun, Mod 1918
13 mm AC Machine Gun, MG-131, developed in 1938 by the Rhein- metall-Boreig
13 mm Solothuru Machine Gun
[3.2 mm (.52°) French Machine ' _Gun [ 1].2 mm MG 271 (f) ]
13.9 mm (.55*) British Machine Gua
145 mm (-371°) Russian A/T Rifte, Panzembwehrbüchse 784 (r)
15 mm (.590") Machine Gun MG-151/15, Antivierraft, Triple Pedental Mount
15 mm Mouner Machine Gun (15 mm MG-151, Mauner)
15.43 min (.607°) Needle Gun M 1862 (See Nove un der 11 mm Single Shot Rifte)
20 mm (.787°) Cankers Automatic AC

15 mm Mauser Machine Gun (15 mm MG-151, Mauser)
15.43 min (.607") Needle Gun M 1862 (See Nove under 11 mm Single Shot Rifte
20 mm (.787°) Cankars Aucomatic AC Canson, Models CZA-1, CZA-2, CZB CZC. Developed during WW 1 by a Polish anginers of Schakers but never used in Combat
20 mm (.787*) Backer Autometic AC

Censon, developed in 1918	
20 mm Ehrhards Automatic At developed at the end of WY 1	Cases

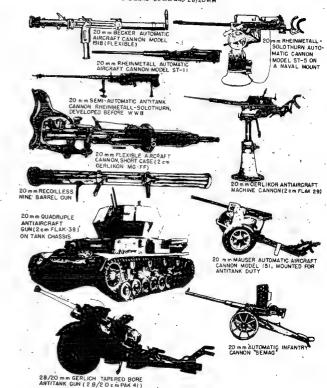
20 mm Lübbe AC Cannon, invented in 1929 by H.Lübbe but not accepted by the German Gove
20 mm Rheinmernil-Solothura Automati Cannon, MK-ST-3,a Naval Mount, developed before WW II

20 mm Rheinmetall Automatic AC Cannon, MX-ST-11, developed before FW II

20 mm Rheinmetall-Solothurn Semi-Auconatic A. I Cannon, developed before www il

Longation, vol 16 (1952), p 190	
A slightly shorter and lighter Model 1871 alrered to take a tubular magazine with a capacity of 8 rounds. It used black powder	10, v2 <sub>z</sub> p 204
It used a cartidge conty on 20 grams of black powder and a lead buller weighing 210 gr	10, v1, pp 467-8 and Ref 12
Used French ball sepmo	5a, p 8
Usud French ball same	54, p 8
Short recoil-operated and cooled by air or water. Tr (with fred) 94 lb, race of fire 400- 40 rpm and mux vel 2750 ft/sec. Used Buitish, German, Italian and Rusaism assuso	5a, p 8 and 8, v 1 * pp 515-16 & 664
Can be seen at the Aberdeen Proving Ground (Listed as a 13.2 mm weapon)	3, p 211 and Ref 12
Short recoil operated and air-cooled. Wt (with feed) 40 lb, mor of fire \$50-960 rpm and mun vel 2360 ft/see	8, v1, pp 457-60 & 662
Used HE, HEI-T, AP-T and T amno	9. p 543
Used French, Beigins and Polish same	5a, p 9
Used British AP some [13.9 mm Past Soil 895 (e)]	5n, p 8
Used AP-Inc and SAP Russian name	3a, p 13
Can be seen at the Museum of Aberdeen Proving Ground, Md	12 ·
Used HE-T, HE-T(SD), HEI-T(SD), AP-T, APTungsten core and T acomo	5a, y 9, 9,p 343 # Ref12
Can be seen in the Museum of Aberdeen Proving Ground, Md	12
Blowback-operated and nin-cooled. We (with feed 91 lb, rate of fire 400-450 spm and must rel 1500 ft/sec	8, v 1, pp 523-5 & 668
Biowback operated and siz-cooled. We (with feed) 66 lb, rate of fire 300-350 spm and max vel 1570 it/sec	8, v 1, pp 512 & 666 and Ref 12
Short recoil-operated and air-couled. We (with feed) 160 lb, rate of fire 250-300 spm and muz vel 2200 ft/sec	8, + i, pp 550 &
Operated by pas-actuated piston and cooled by mr. Wr. (with feed) 107 lb, rare of fire 360 and mux vei 2650 ft/sec	8, v 1, pp 548-9 & 666
No characteristics given	8, v 1, pp 551-2
Short recoil-operated and sir-cooled. We (with feed) 118 lb, rate of fire 550-380 and muz vel 2250 ft/sec	8, v 1, pp 553 æ 668

# WEAPONS CALIBERS 20 mm AND 28/20 mm



# (Mamanal Co. of the

	(Wespenz) (cont'd)	
Caliber and Designation	Remarks, Uses and Some Characteristics	References
20 mm Rheinmetail Automatic AA Cannon, Flak 30, developed before WWII	Short record-operated and assembled. We (with feed) 141 lb, rate of fire 200-280 and muz vel 2950 ft/sec. Used HE-T projectiles	5h, table 1 and 8, v 1, p 666
20 mm Oerlikon Short Case AC cannon (2 cm Oerlikon MG-FF)	Used projectiles: HE, HE (self-destroying), HELT, AP, APHE and API	5n, pp 44-5
20 mm Oerlikon Automatic AC Cannon, Modela F and S, developed by the Oerlikon Co, Zürich and adopted by the Germans before 智慧社	Blowback-operated and air-cooled, We (with feed) 136 lb, rate of fire 280 and muz vol 2610 ft/sec	5m.p.44; 8, v 1, pp 516&618 and Ref 12
- 20 mm Occirbon AA Cannon (2 cm Flak 28)	Used AP, AP-T, HE, HE-T, REF-T and HE-T self-destroying projection	5a, p 43
20 mm Ostlikon AA Cannon (2 cm Flak 29)	Can be seen at the Museum of Aberdeen Proving Ground, Md	12 =
20 mm Mauser Automatic AC Cannon, Model 151 (MG-151), developed before WWII by the Waffenfabrik Mauser A - G	Short recott operated and nir-cooled. We (with feed) 93% th, rate 700-750 and max wel 2550 fr/sec. Called by Samit (Ref 9) one of the most remarkable AC MGs in existance	5n,p45; 8, r1,pp 602-4 & 666; 11, p 501 and Ref 12
20 mm Mauser Automatic AA Camon, Flak 38	Short recoil-operated and siz-cooled. Wt (with feed) 123 lb, rate of fire 420-480 and muz vel 2950 h/sec	8, v l, pp 605-6 ac 666 and Ref 12
20 mm Dutch A/T Rifle [ 2 cm PnB 785 (5) ]	Used Dutch AP and HE smmo	54, p 15
20 mm Farnch Machine Gun [ 2 cm NG 39 (f) ]	Used French HE shell, type 39	5a, p 13
20 mm Solothura Cannons: 2 cm KwK 30, 2 cm KwK 38 2 cm Flak 30, 2 cm Flak 38 2 cm Flak Vierling 38; 2 cm GebFlak 35 and Italian 2 cm M 35 (i)	Ured ammunition:  HE, HE, HE, THE,  HE-T, HE-T (self-destroying, HE (Italian),  AP, AP-T, AP-T, AP-T (self-destroying),  AP-T (sriftean) and AP (Italian)	5e,pp 43-4
20 mm Meuser Machine Gua, MG-213, developed during WW II	Not described here because the selecence	8, v3, pp 44-51
20 mm Recoilless Casson (9 barrels)	Can be seen at the Museum of Aberdeen Proving Ground, Md	12
20 mm had 25 mm Semag Auto- matic Cannon for infanery (Mounted on a wheeled carriage)	Developed in 1921 and 1923 but not adopted in Germany because it was considered to be too heavy, A sumber of Semany were nold before 1930 to China and to Spain	8, v 1, pp 514-15
25 mm (.984°) French AA Gun [ 2.5 cm Flak Hotchkias (f) ]	Used French HE and HE-T shells	5a, p 14 and Ref 12
25 mm French A/T Guest 2,5 cm Pak 112 h 113 (f) and 2,5 cm KwK 12l (f)	Used French AP type 114 shall .	5a, p 14
27 mm (1.063) Signal Pissol (Kampipiatole), Modified	Can be seen at the Museum of Aberdeen Proving Ground, Md	12 .
28/20 mm (1,102/0,787*) Tapered Bore A/T Rifle (sP2B# 41), called also Squeaze Bore or Gerlich Gun	Used ammo: HE (2.8 cm Sprgr Pace 41) and AP (PzgrPace 41)	5a, p 14; 9, p 371 and Res 12
30 mm (1.181*) Mauser Machine Gun, MK-213C, developed during WW IS	Not described here because Ref 8, v 3	8, v 3, p 44
30 mm Rheinmetall Automatic AC Canoon, MK-101, developed in 1942	at a c	8, v 1, pp 555-61 & 666-8
30 mm Rheinmetall Automatic AC Cannon MK-103, developed to 1943	Operated by gas-actuated piston and nis-cooled, W: (wit' feed) 308 lb, rate of fire 420 and 'mur vel 2820 ft/sec	8, v 1, pp 555-61 666-8 & Ref 12
30 cm Rheinmerall Automatic AC Cannon MK-108, developed in 1944	Blowback-op mated and gas-cooled. Wt (with feed) 135 lb, rate of fire 400-450 and max val 1640 ft/sec	as above
30 mm Automatic Recordings Commen	No. 1. In and	

Not described here because the reference

Used HE and AP ammo: 3 cm Sprgr and 3 cm Page 40

Can be seen at the Museum of Aberdeen Proving Ground, Md

us coalidential

8, 7 1 pp 630-31

9, p 379

12

30 mm Automatic Recoilless Cannons, SG-116, SG-117 and SG-118, developed during WW II by the H.Goring Wecke

30 mm Solothum AC Causon (3 cm Flag K)

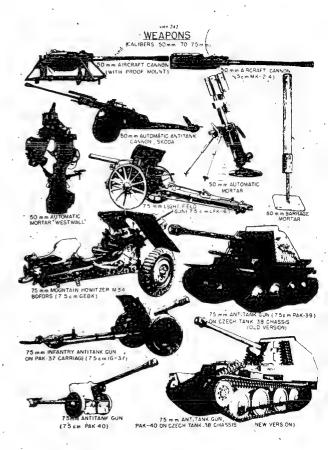
30 mm Aircraft Machine Cannon, MK-303

**WEAPONS** (CALIBERS 30 mm TO 47 mm INCLUSIVE) MUZZLE BRAKE 37 mm AUTOMATIC ANTIA RCRAFT CANNON RHEINMETALL FLAK 18 ECUPE RAYOR SOLENDIO MAGAZINE BECEIVER 30 mm AUTOMATIC A.RCRAF SPRING HOUSES CANNON RHEINMETALL MK-103 30 mm AU TOMATIC AIRCRAFT 37 mm REVOLVER CANNON TH ANTIA ROBAFT GUN (3 7cm FLAK 36) 42/28 mm ANTITANK GERLICH TAPERED BORE GUN (4 2/2 8 cm PAK-41) 47 mm ANTITANK GUN ON PZ KWI CHASSIS 47 mm ANTITANK GUN M 38 (CZECH DESIGN)

Ger 240

# (Wespons) (cont'd)

		100 10	(n-wone) (cone c)	
	Caliber and Designation	" " " " " " " " " " " " " " " " " " "	Remarks, Uses and Some Characteristics	References
•	37 mm (1,457°) Rheinmerall Automat AA Cannon, Type 18 (3 cm Flak 18) developed prior to WW II by Rheinma Bora, g A.+ G	ıc	Short recoil operated and air-cooled. We (with feed) \$95 ib, rate of fire 160-180 and mux vel 2520 ir/sac. Used projectiles HE, HEI, HEI-T, HE (high capacity) and AP	8, v 1, pp 154 & 666; 5a, pp 45-6 & 9, p 384
•	37 mm AA Camnons 3.7 cm Flak 36, Flak 37 and Flak 43		Used ammo HE (3.7 cm Spigr Patr 18), HE, bigh capacity (Mings Patr 18), HE (8r Spigr Patr 18), HEL-T (8r Spigr Patr 18 L'apur) and AP, without cap (Pigr Patr 18)	5s, pp 45-6; and 9, p 384
	37 mm A/T Canson (3.7 cm Pak)	•	Used: AP prof with core, arrowhead design (3.7 cm Page Patr 40); AP prof without cap (Page Patr) and HE prof 18 modified (Spar Patr 18 mg)	54.9 15 and 9.pp 373 & 386
,	37 mm A/T Campon, Fixed Defence (3.7 cm Pak K)	'.	Used amno; HE (3.7 cm SprgrPatr) and AP (PagrPatr 18 umg)	50,p 15
`	37 mm Naval Gun: 3.7 cm SK C/30		Used ammo: HE(3.7 cm SpegrPatr 40) and HE-T (SprgePatr L'apur)	54, p 15 and 9, pp 382 dr 388
	37 mm Naval Gun 3.7 cm SK C/36		Used HE projectales	5b, table 1
,	37 som Tank Gun: 3,7 cm KwK		Used ammo: HE (3,7 cm SprgrPatr 18 umg & SprgrPatr 40), HE-T (SprgrPatr 18 L'apur), AP (PagrPatr & PagrPatr 40) and Stick granabe (Stietge 41)	5a, p 35
	37 mm A/T Gun: 3.7 cm Pak 41		Uzed stick (rodded) bombe 3,7 cm Stielgr 41	9, p 383
٠	37 mm Czech A/T Gua: 3.7 cm Pak 37 (t)		Used Czech ammo: HE (3.7 cm SprgrPatr 34), AP (PzgrPatr 34, 37, 37 umg & 40/37) and Stick Grenade (Stielgr 41)	5e, p 16
	37 mm Czech Tank Gun: 3.7 cm KwK 38 (t)		Same na noove	34, p 36
	17 mm Ejench Tink Guns: 3.7 cm MwK 143 (f) (leng) and 144 (f) (kurs)		Used French HE and AP ammo: 3.7 cm 5. Sprgd'att 143,147,148 (f) and PspPatr 145k 146 (f)	5e, p 35
	37 mm French Light Gun: 3.7 cm LK 152 (f)		No description given	5=, p 59
	17 mm Russian Infantry Howsters: 3,7 cm IG 145 & 146 (r)	•	No description gives	5h, p 39
	37 mm Polish A/T Com, called by the Gormans 3.7 cm Pak (p)		Used Polish design AP proji 3.7 cm Page (p)	9. p 382
	37 mm Cammona: Flak 36, Pak 37, Flak 43, Revolver Cannon and AC Cannon(used in Stake aircraft)		Can be seen at the Museum of Aberdeen Proving Ground, Md	12
	40 mm (1.575") ΑΑ Georg Type 28 (4 cm Flak 28)		Used some: HE (4 cm SprgrPasr Lb 28), HE-T ( SprgrPasr L'spus), HEI ( BrSprgrPasr) AP (Pagr- Putt, 18) and AP-T (PagrPasr L'spus)	3a, p 46 and 9, pp 388-9
	42:28 mm (1.654/1.102") Tapered Bo Gun 41 (4.2/2.8 cm iPak 41), called also Gerlich Gun or Squeeze Bore Gu	re n	Used mmo: HE (4.2 cm SprgPag IPak 41) and AP with core (PaggPair)	5a, p 46 and 9. pp 388- ;
	44.5 (1.75") mm Recoilless Greunde Discharger Penzerfeuser 30, Holen (Armored Fist, type 30, small) iomnetly called Fessingermore 1, Erst Carricage, type 1) and a larger model Penzerfeuser 30, formerly callet Fessingermod Note: Later models of weapon were.	l Called <b>P</b> ar	Smooth-born tabe, 1.75 diameter and 31.5 long which first is believe that gcf./ Tairsaile, resembling in appearance is roud that gcf./ Tairsaile, resembling to appearance is roud to the properties are supplied to the Powertier satisfied as White with read is 9% long and the figured cylindrical body is 30. Diameter of warbend is 3% and of body 12.0	9. pp 339-40 11. p 522 and Ref 13
	4 5 cm Pak 184 ti 184, 1 (r)		Used Russian HE and AP name	3a, p 17
	45 mm Russian Tank Guns. 4,5 cm KwK 184, 2, 184/3 & 184, 4 (c)		Used Russian HE and AP amage	54, p 17
	15 mm Russian Infrastry Howitzer: 15 cm IG (86 (r)		No description, given	5a, p 59
	45 mm Italian Mortan 4.5 cm GrW 176 (r)		Used HE bomb, Wgr (i)	5n, p 26
	46 mm (1 8111) Pulish Mortars 4.6 cm GrW 11 (p) and GrW 16 (p)		No description given	5a, p 26



•	*	
Caliber and Designation	(Wespece) (coat'd)	
47 mm (1.850*) Austrian "Böhler" Gun	Remarks, Uses and Some Characteristics	References
47 mm (I.B'0") Austrian "Bohler" Gus [ 4.7 cm Bohler K(5) or 4.7 cm Pak	Used Austrian design AP and HE ammor 4.7 cm Page Pater 35 (3) and Spegr Page (6)	54. p 17 and 9, pp 391-2
47 mm Belgian A/T Gan [ 4.7 cm Pak 185 (b) ]	Used Belgian HE and AP ammo	5a, p 17
47 mm Czech Guns: 4.7 cm K 36 (t), Pak Skoda 1936 (t) and Flak 37 (t)	Used Czech design liE and AP amme: 4.7 cm Spigi Pair 36 (t), Pagi Pati 36 (t) and Flax 5" (t)	5a. p 18, 9, pp 390-28 Ref12
47 one French A/T Gun [ 4,7 cm	Used French HE and AP amount 4.7 cm . SprgePatr and PagrPatr	5a, p 17
47 mm French Twok Gun: 4.7 cm ' KwX 173 (f)	Used French HE and AP anyon 4.7 cm <sup>2</sup> SprgrPutr 175 (f) and Pagr Putr 176 (f)	5a, p 36
47 mm Italian A/T Gun ( 4.7 cm Pak 177 (1) )	Used Italian liE and AP ammo	5a, p 17
10 mm (1.9685*) Tank Gua: 5 cm KwK	Used amout HE (5 cm Sprgt Part 58), AP (Pzgt Part 39, 40 & 40/g) and Stick grenade (Stickgt 42)	5a.pp 36-7 and 9.pp 376 & 395-5
50 mm Teak Gun 38: 5 cm KwK_38	Used AP ammo: 5 cm PagrPatr	9, p 395 & Ref 12
50 mm Long Tank Guns: 5 cm KwK 39 (L/o0), KwK 39./1 and KwK 19/2 (L/60)	Used ammo: HE (5 cm.SpigePaur 39), AP (PugrPaur 39, 40 & 40/1) and Stick Greede (Stiefgr 42)	5a, p 37
50 mm Tank Guns: 5 cm kwK 40 and KwK L/42	Used ammo: HE (5 cm Sprgr Patr 38), AP (Pzgr Patr 39, 40 & 40/1) and Stick Greande (Stielgr 42)	5 n, pp 36-7
50 mm A/T Gus 38 (5 cm Fak 38)	Used ammo? HE (5 cm Sprgr Paw 38) and suck greande (Stielgr 42)	5a,p 18
Note: According to Ref 5b table I, this gum or 1 cm Pak(L/60)	existed in 50 and 60 caliber lengths and was designated a	5 co Pak(L/50)
50 mm A/T Casemate and Turret Gun, long mount 5 cm Pak KuT (LgL)]	Used ammo: HE (5 cm SprgrPatr 38), AP (PagrPatr 39, 40 & 40/1) and stick grenoise (Stiving 42)	5n, p 19
50 mm A/T Camemate and Turrer Gun, short mount [ 5 cm Pak KuT (KaL) ]	Used ammo: Short HE (Xz 5 cm SprgrPatr 38) And Short AP [ Kz 5 cm PagrPatr i Pak Ku T (XuL)]	5n, p 19
50 mm Light Morters: 5 cm Grb 36 and Grb M/19	Used HE mostar anmo such as: 5 cm Vgr Pate 36, 39 & 41	5a, pp 26-7 and - 9, pp 530-1
50 mm AA Gum 41 (5 cm Flak 41)	Used amono: HEI-T (5 cm Br SprgrPath 41 L'apur), HE-T (SprgrPau L'apur), AP (PagrPatr 39 & 42) and AP-T (PagrPatr 42 V)	5a, p 46 and 9, p 393
50 mm Autometa CArcusti Canson (5 cm BE) developed during VV [] by the Rheinmetall-Botnig A - G	No description to given here because Ref 8, v 3	8, + 3, > 638
50 mm Automatic AC Caanon, MK-214	Can be seen at the Museum of Aberdeen Proving Ground, Md	12
50 am AC Cannon	Same as above	12
50 mili A. T. Automatic Casaes, Skoda	Same as above	12"
0 mm Automatic Morter (Vestwall)	Same as above	12
50 mm Belgian Light Morear, 5 cm 51%, 201 (b)	Used various mortar amont Belgian, French, German and Russian	5a, p. 26
50 mm French Light Horism 5 cm G/W 203 (f)	Same as above	5n, p. 26
50 mm Russiant Light Mortaer 5 am 1 Gew 205 (r)	Same as above .	5m, p 26
50.8 mm (2") British Mostari 5 cm	Used British HE and smoke bombs	5n, p 27
55 mm (2.165°) Aircraft Automatic Estion, MK-112, developed bear he cad of WW II by the Rheim- netall-Borsig A - G	Not described here because Ref 8, v3 in considered confidential	8, v 3, pp-614 & 627
55 mm Automatic Cannon, MK-114, not fully developed during WW II	Same as above	B, v 3, p 636
55 mm Automatic Recoilless Lannon, MX-115, developed by Rbeinmetal-Boxing A - G But not put into production	Same as above	8, v 3, p 637



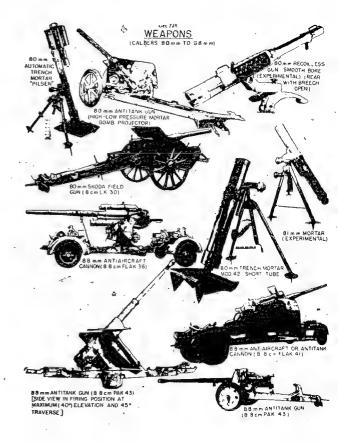
	(Wespens) (cast'd)	
Caliber and Designation	Remarks, Usen and Some Characteristics	References
60 mm (2.362") French Mortan 6 cm GrW 225 (f)	Used french HE cast sreel bomb: 6 cm Stg (Stabilguss) Mgs 225 (f)	Sa, p. 27
60 mm Morter Barrage	Can be seen at the Museum of Aberdeen Proving Ground, Md	12
65 mm (2,559°) French Mountain Pack Howster: 6,5 cm Gebk 221 (f)	Used French HE shell: 6.5 cm GrPotr (f)	5a, p 52
65 mm Erruch Quick-Firing Gun: 6.5 cm SGeech (Schneilgenchurz) 02 (f)	Used French amano: HE [ 6.5 cm GrPner AZ & GrPner DoppZ (f) ] and AP [ PagrPntr (f) ]	`Sa. p 60
65 mm Italian Moustean (Pack) Howitzer: 6.5 cm GebH 216 (i)	Used Italian ammo: HE [ 6.5 cm Sprgr Patr (i) ] and AP [ Pagr Patr (i) ]	¶a, p 52
65 mm Yugoslav Mountain (Pack) Howitzer: 6.5 cm Gebl. 222(j)	Used Yupoulav ammo: HE[ 6.5 cm Spres Patr 222 ()] and Shrapnel [ SchrPatr 223 ()) ]	5e <sub>v</sub> p. 52
73 mm (2.874°) Rocket Launcher, Febra Goret , capable of fixing 35 sockets simultaneously	A 35-frame innacher with fant elevating and transverse genra, it fixed 7.3 cm Raketenappeng- granate or 7.3 cm Propagander-preservance 41	9, pp 254-6
73-mm Hountain Guest 7.5 cm Gebl; 75-4 Gebl: 14/15	Used amout HE (7.5 cm GebGr 15, GebGr 15 Al, GebGr 15 Ror, GebGr 39), HoC (Gr 39 M/A), as well as some Austrian and Czech amou	5a, p 55 and 9, pp 359 & 403
75 mm Shoda binnerain Gup M 15: 7.3 cm Gubli M 15	Seme aumo an above	34, p 35
75 mm Light Field Gun 16r 7.5 cm IFK 16	Can be seen at the Museum of Aberdeus. Proving Gaound, Md	12-
75 mm Field Gun 16/1: 7.5 cm FE 16/1	Used HE proj (7.5 cm KGrRockPS) and AP proj (KGrRocPu)	9,pp 421 & 423
7.5 mm Field Gan 16, new patterns 7.5 cm FE 16nA	Used some name as above, plus HoC peri (7.5 cm Gr. 38,Mi/A)	30, pp 60-1 and 9, pp 409, 421 a
75 mm Light Field Gen 1ft 7,5 cm 1FE 18	Used some: HE (7.5 cm-Sprgr Pacr 34 in KGcRockPS), AP (KGcRotPa), APC (PaGrPur 38), HoC (Gr 38 HI/A it GrPar 38 HI/A) and Smote (Nbgr Pacr)	3a, pp 61-2 and 9, pp 400-3, 407, 409, 421 at 423
75 mm AA Cassen 18s 7.5 cm Flak 18	Can be seen at the Museum of Aberdeen Proving Ground, Md	12
75 mm Light Infentry Howitzer 12: 7.5 cm IJH 18	Used name: HE (7.5 cm )gs 38 FES) and T HoC (Jgs 38 HL/A and HL/B)	9, p.p. 413, 418 a. 425 and kef 12
75 mm Light Mountain Infancry Howkner 18: 7.5 cm (Gebj H 18	. Used some projectiles us previous weapen	9, pp 413, 418 a
75 mm Light infancry Guast 7.5 cm IJG 18, 37 & 42 d	Used masso; HE (7.5 cm [gr-18, ]gr 18 Aft, HoC (]gr 38 Hl, ]gr 38 Hl/A, ]gr Paur Hl/A, ]gr 38 Hl/B) and indicating shell ([gr Deux)	5a, p 30; 9, p 404 and Ref 3 2
73 mm Light Infracry Mountain Gust 7.5 mm (Geb) G 18	Same as above	54,230 and
75 me Henry lefsery Gmes 7.5 cm sJG 33, sJG 33/1 a sJG 42	Used assets: HE (15 cm ] gr 33, 1gr 38 & Jer 38 Al), NoC (Jer 39 Hl/A & Jer Hl/B) Stock-grande (Stockgr 47), Smoke (Jer 38 Nb) and Me (Jer 38 Br)	9,79404-5 5mp31
75 mm Haval Gun: 7.5 cm SK C/34 (L/33)	Used HE projectiles	5h, table 1
75 mm Mountain Hornitaer Boines: 7.5 cm GebH 54	Can be seen at the Museum of Aberdeen Proving Ground, Md	12
75 mts Mountain Gun 36; 7,5 cm GebG 36	Used amno: HE (7.5 cm Ge 34 SprgrPats 34, KGrRoxAl & KGr 34 Al), HoC (Ge 38 Hl/A, Hl/B & Hl/C) and Smote indicator (KGrRox o Deut blue & KGrRox Deut)	59.p 52 and 9. pp 390, 401, 409 & 416
75 mm Gam 37: 7,5 cm K 37 L/24	Used amone HE (7.7 on Sprig Part), HoC (GePerr 38 HV A, HV B & HVC), AP P garp Part), Cane Shot (Ri Part), Smoke (Nipp Part) and indicating shell (KGPart Rec Part)	34, 258
75 mm Tank Gha: 7.5 cm EwE 75 mm Assault Gas: 7.5 cm StuG	Sense an above	5n,p38
75 mm Field Gun 3th 7.5 cm PE 3a	Same as above	5n, ji 38
77 Can PE 38	Used ammo: HE (7.5 cm KGrPntr, Sprgr L/4.5), HoC (GePntr 38 Hi/B & Hi/C) and Smake indicator (KGrPntr Ret Deut)	50, p 62 and. 9, p 415
* * * * * * * * * * * * * * * * * * * *		

	(Wompons) (Cont'd)	
Orliber and Designation	Remarks, Uses and Some Characteristics	
75 mm Tank Gun 38: 7.5 cm KwK 38	Used HoC snimo: 7.5 cm Gr Patr 38 HL/A	Retempes
75 mm A/T Gun 39: 7.5 cm Pak 39 c/48	Used a some: NE (7.3 cm Sprgr Patr 34), HoC (Gr Patr 38 HI/A, HI/B & HI/C), AP (Pzgr Patr 39, Pzgr Patr 40 & Pzgr Patr W) and Smoke (Nbgr Patr)	9, p 409 5a, p 39
75 mm Tank Guns: 7.5 cm KwK 40 L/43 and KwK 40 L/48	Same as above	5a, p 39
75 mm Assault Guan: 7.5 cm ScuK L/43 & StuK L/48	Same as above	5a, p 39 ·
75 mm A/T Guna: 7.5 cm Pak 97/38 and 97/40	Used ammo: HE (7.3 cm Sprgr Patr), HoC (GP Patr 15/58, NI, GrPatr 38 HI, GrPatr 38/97 HI/A & HI/B), AP (Prgr Patr 39), and Stat (Lt Gr Patr) and some foreign ammo	5a, p 21 and 9, pp 415, 419-2 & 425
75/50 mm Skoda Duni Purpose Gus	Used HE ammo: 7.5 cm Sprgr Patr 75/50	9, p 406
75 mm A/T Gun 40: 7.5 cm Pak 40	Used ammo: HE (7.5 cm Sprgr Patr 34 KwK, ecc), HoC (GrPatr HJ/A, HI/B and HI/C, etc), AP (Pagr Patr 40, Veichessen or Prgr Patr 40, barter Kern) and Smoke (Nbgr Patr)	5a, p 21; 9,pp 398, 401-2, 408-9, 411 a 41 a Ref 12
75 mm Solf-Propelled A/T Gums; 7.5 cm Pak 40/1 (Sf, Pak 40/2 (Sf) and Pak 40/3 (Sf)	Used NoC ammo, such as 7.5 cm GrPatr H1/B	5n, p 21; 2:p 411 and 3 Ref 12
75 mm Tank Gun 40: 7.5 cm KwX 40	Used samo: HE (7.5 cm Sprgr 34 & Sprgr Patr 34)  APC (Pzgr Patr), HoC (Gr Patr HI/A, Gr Patr HI/B, Gr Patr 38 HI/B & Gr 38 HI/B), Smoke (Nbgr Patr)	9, pp 398, 400-3, 409, 411 & 417
75 mm Recoilless Gus for Airbotne Troops Type 40 (7.5 cm Leichtes Geschütz 40)	Used same ammo as shove, less Sprgr 34 and Gr 38 MI/B	9, pp 398, 400-3, 409 & 411 & Ref
75 mm Assault Gua 40 (7.5 cm SmG 40)	Used atomo: HE (7.5 cm Spegr Patt 14), APC (Psis 39 FES), NoC (Gr Patr 18 HI/A & HI/B, G/38 HI/B & Gr Patr HI & HI/B) and Smoke (Nbgr Patr)	9, pp 398, 400-2 409-11
75 mm Assault Guns: 7.5 cm Stulk 40 L/43 and Stulk 40 L/48	Used a mme: HE.(7.5 cm Sprar 34) and HoC (Gr 38 HI/B)	9, pp 411 a 417
75/55 mm A/T Gun 41: 7.5/5.5.cm Pak 41 [ Gerlich Type Gun, called also Tepered Bore Gun, Reducing Bose Gun or Squeeze Bose Gun ]	Can be seen at the Museum of Aberdonc Proving Ground, Nd. Used AP proj with issa core [7.5 cm²seq; 40 (W) ] and AP proj with ungsuen carbible core, arrowhead design [Page Part 41 (HK)]	5m, p 20; 9, pp 378, & 408 and Ref 12
75 cm Assault Con 42: 27.5 cm Star 42	Used amno: HE (7.5 cm SpegrPatr 42), HoC (GrPatr 38 Hi) and AP (PagrPatr 39/42, 40 ± 40/42)	5n, p 39
75 mm Tank Gun 42: 7.5 cm KwK 42 L/70	Same as above	5a, p 39-
75.mm Tunk.Gon 42: 7.5 cir KwK 42	Used amno; HE (7.5 cm Sprgr 42) and AP (Pagr 39/42)	9, pp 411 & 423 and Ref 12
75 mm Assault Gun 42: 7.5 cm Stuk 42 L/70	Used same amno as above	g, pp 411 4423 and Ref 12
75 mm Islantry Howitzer 42, Smooth Bore: 7,5 cm IH 42	Can be seen at the Nuseum of Aberdeen Proving Ground, Md	12
75 mm Recoilless Gun 43; 7.5 cm RFK (Ruckstonsfreie Kanone) 43	Can be seen at the Museum of Aberdeen Proving Ground, Md. Used HoC proj: 7.5 cm Gr Patz 43 Hl	5n, p 21 and Ref 12
75 mm A/T Gun 50, Experimental: 7.5 cm Pak 50	Can be seen at the Museum of Aberdeen, Proving Ground, Md	12
75 mm Relgian Guna; 7.5 cm FK 234 (b) 7.5 cm FK 235 (b) 7.5 cm FK 236 (b)	Uned anmo: HE: Spegs 230/7, (f) and HoC:.Gr 15/38 HI/B (f) HE: Spegs 240/2 (b) HE: Spegs 1900/15 (f)	5a, p 2i and 9, pp 415, 420-1 a-425
75 mm Czech AA Gun; 7.5 cm, Flak (Skodu)	Used Czech HE ammo, 7.5 cm Sprgs Pau (t)	5a, p 46
75 mm Czeck Field Gun 17:	Used Czech HE ammo: 7.5 cm Gr M/17	5a, p 66
75 mm Durch Gung: 7.5 cm PK 243 (h) 7.5 cm FK 243 (h) L 30	Used same: HoC: Gr 38 HI/C (b) HE: KGrRot KPS and K Gr Rot Pz	9, pp 413, 421 & 423

# (Waspens) (coet'd)

	(Hambours) (COOL (7)	
Caliber and Designation .	Remarks, Uses and Some Characteristics	References
75 mm French Guss: 7.5 cm FK 231 (f), tde:97 7.5 cm FK 232 (f), tde:97/33	Uned among HE: Sprgr 1900/15 (f) & Sprgr 131/1 (f) and HoC: Gr 15/38 Hi/B (f) HE: Sprgr 231/1 (f) & Sprgr 264 (f) and	5s, pp 21 st 41 9, pp 413-25
7.5 cm GebK 238 (f), Mie 1928 7.5 cm XwK 251 (f), Mie 1935 7.5 cm Flak M 17/34 k Flak M 36	HoCn Gr 17/38 H/B (1) rE: Sprgr 33/1/ (1) & Sprgr 364 (1) and HoC Gr 15/3d H/B (1) HE: Sprgr 231 (1) HE: Sprgr 231 (1) HE: Sprgr 24 (1)	
75 mm Field Gues: 7,5 cm FK 237 (1) & 244 (1)	Used Junium HE and Shrapped among	34,>64
75 mm Italian Mountman Gun; 7,5 cm Gold 259 (1) (See num; under Vonpous in the Italian mec	Lord same same up 7.5 cm GebK IS ction)	54, p.55
75 mm Norwegian Gunst 7.5 cm FK Schnerder (n) 7.5 cm FK U (n) 7.5 cm FK L/L7 (n) 7.5 cm FK L/L7 (n)	Used Norweging animo HE: Gids art he/31 (a) and Shinpowel: GiSchirle) HE: Gids art he/31 (a) and Shinpowel: GiSchirle) HE: Gids art he/31 (a) M/3 (a) M/3 (a) HE: Gids art he/32 (a) M/3 (a); HE-lac: BrG(Kart he/42 (a) M/3 (a); HE-lac:	3n. pp 35 at 03-06
75 mm Polish Gune:	No intermetrice available  Used seems	
7.5 cm FK 97 (p) 7.5 cm FK 92/26 (p)	HE: Sprgr 1900/15 (f) #: HoC:: Jgr 38 Ht/B	5s, p 21 mad 9, pp 419-20 m 423
75 mm Yugonler Ginns: 7.5 cm FE 249 () Mod 12 (Schneider) 7.5 cm Gebt 258 ()	Used aspens HE: Spept 264 (f) & Spept 1900/15 (f) and HoC: Gr 15/38/HU/B (f) & Gr 38-97 HU/C (f) Same assess as 7.5 cm Grb& 15	5a, pp 21, 54-5 at 9, pp 415, 419-20 and 423
7.5 cm GebK 259 (1) 7.5 cm GebK 285 (2)	HE: Sprgr 249 (1) and Shimpani (Schr 250 & 251) HE: Sprgr 200 1 & 200/2 (1)	
75 mm Yugonlav Mortae: 7.5 cm CeW 229 (s)	Used HE bomb: Wgr 229 (j)	5n, p 27
76 mm (2,992) British AA Gun; - 7,6 cm Flok (a)	Used British HE fixed wond: 7,6 cm - Spegi Patr (a)	5m, p. 48
76.2 cms (3.000*)K to so am. Gen a: 7.62 cm FK 39 (2) 7.62 cm KK 390/) and 310 (2) 7.62 cm FK 390/) and 310 (2) 7.62 cm FK 599 (2)	Used various Russian design projection sither captured or manufactured in Geometry	5a, pp 25-4, at 40-1; 9, pp 426-32
and many other models were captured and used by the Germans during We II (See Venpous in the Russina nection)		
76.5 mm (3.004) Asserian Field Gener 7.65 cm F K 5/RG/FK 1726, and F K 1855; manufactured by Shoda Works, Pilson	Used Austine and Casch design asses	7 30 <sub>4</sub> p 68
76.5 cm French Field Gonst 7.65 cm FK 5/8 (f) & FK 17	Used French design smoo	5a, pp 68-9
7.6.5 mm Yugo slav Gme at 7.65 cm FC 300 (1), 303 (1), it 304 (j), manufactured by Skoda Works	, Used Yagoniav, Czech and Austrian anmo	5, pp 68-9
77/45 mm (3.03/1.77) Receiffers Automotic Camoon, 5G-13/A, deraloped during 19 if by the H.Ghing bette but not put inm- production	Not described here because Ref 8,9 3 in confidential	8, v 3, p 630
BO non (3.15°) Medium Mortus, designated 8 cm SGr# 34	Mend HE marker Ammot 8 cm Wgr 34, Wgr 38, Wgr 39 dt Wgr 38 Dewt)	9, pp 529, 531 & -
80 mm Medium Norme, designaced as 7,5 cm MGe € 34	Land amoke mortae ammo (7.5 cm Wgr 34 Mb)	553 9, p 532
80 mm Trench Norfar, designated as 7.5 cm KaGra 42	Used NE Horter ammo (7,5 cm Wgr 34)	9, pp 532-3
80 mm Automacic Mortar, "Pilsen"	And Smoke (Vgr 34Nb)  Can be seen as the Managem of Sheet	sad Ref 12 12
80 mm 4/T Gun (High-Low Pressure Mortar Romb Projector)	Same as above	12
But man Grounds Grown to	•	**
ou man smooth tote Feapon, called Puniors with the American Borng Co and issued to the troops at the end of 1944	Mounted on a carriage weighing 1370 lb, it fired a linned projectile at a mux wel 1700 ft/ner to an_officerive range of 700 meters. The shell welghed 6 lb, was 187 long and bad a presentation of 140 ms at 000.	6, p 188

Mounted on a carriage weighing 1370 lb, it fired a finned propertile at a muz wel 1700 ft/neg to anytiective range of 700 nevers. The shell welghed (b), was 18 long and had a pewetrotron of 140 ms at 60° angle of impact



## Ger 249

	(membews) (cont.q)	•	
- Caliber and Designation	Remarks, Users and Some Characteristics	References	
A) mm Multiple-Rocket Laigncher; designated as 8 cm Reketore) of a fockworfer .	It fired HE asserts rockets (8 cm Rakesma Sprengranten), wientlar in construction to a standard Russian assertat rocket	9, p 237	
80 mm Trench Mortas, Short Tube, Mod 42	Can be seen at the Museum of Aberdeen Proving Ground, Md	. 12	
80 mm Reculiess Gun, Smooth Bure, Experimental	Same as above	12	
BO at a Carch Field Guar Bear FK 18/17 (1)	Used Caech HE shell, 8 cm Gr M 30/17 (t)	54, p 69	
80 mm Carch Field Gunt Bem FK 30 (t) *	Used Caech HE and AP projectiles: Gr 30, Ge 33 and Pagr (r)	5, p 69	,
80 mm, Polisk Morans 8 cm G/♥ 28 (p)	Used berman and foreign projectiles	54, pp 20-9	
\$1 må (3.10°) Morene, Frysermental	Shee As above	1.2	
Bi-82 pm Fourige Morrary used by the Ghrmans included; S.1 cm GeV 274 (das), 8.1 em GeV 274 (das), 8.1 em GeV 280 (b), 8.14 cm GeV 280 (b), 8.14 cm GeV 286 (b), 8.14 cm GeV 286 (b), 8.24 cm GeV 278 (c) 8.14 cm GeV 286 (b), 8.24 cm GeV 274 (c)	Bard Greman and foculga projectiles	54, pp 28-9	
Thirty, 28") Check Design AA God (8.37 cm Flax M/22'(t))	Uned Czech design and manid projectiles; 8.35 cm Gr 23/30 (t) and 8.35 cm Pagr (t)	54, p 48 and 9, p 436	
83.8 mm (3. 105") British Field Guam 8.38 cm FE 271, 272 m 273 (a)	Used British RE and smoke shello: Sprgr Pau 100 and Nbgr Patr 106 (e)	3n, p 70	
83.8 mm Rusema Field Gun; 8.38 cm FK 105 (r)	No saformation given	5a, p 70	
to wm (3, 180r) Single Barrel Rocket Launcher, de signated a 6 H.6 cm R Ag M 42 and weighing 40 kg	is lived various tochess used by the Navy, such as HE, flare, etc.	9, p 241	
86 mm Rocket Launcher (No. Gennan dasignamen is given)	Used HE rockets, designated, 8,6 on ESprag L/4,5 and ESprag L/3,5.	9, pp 256-7	
8".0 may (3,745") Bristish Field Gwis 250, 281 & 282 (a) (25 pounders)	Used Stitish amono: HE [ Gr 292 at 295 (e) ] and Smoke [ Rauchgr (s).]	34, y 70	'
Bot man (3.405°) AA Gun 18; 8,8 cm Flair 18	Used meso: HE (8.8 cm Sprat L/4.5, Sprat L/4.5 ZtZ & Sprat Pate L/4.5 Ks), AP (Page & Page 39), APC (Page Pate Bd Z) and Juc Shimpael (Gr Br Schi Flak)	9, pp 438, 441, 444, 446 & 448	
Bi um Tink Gen 36; B.\$ cm KwK 36,	Used HE ammo: 8.8 cm/Sprgr L/4.3 1	9, p 444	
86 nm Neval Gunst 8.8 cm SK C/25, C/30, C/11, C/32 ± C/35	Used HE and Star projectiles	56 <sub>s</sub> mbl <sub>e</sub> 2	
85 mm Torpedobout Gen;" 8.8 cm Thes.K. L/45	Used HE and Star projectiles	5h, table 2	
85 thm Yink Cun 36 (56 calibect long): 8.8 cm KwK 36 L/56	Used amono; HE (&B cm Spear Pau L/4,5), HoC (Ge Pair 39 HI), AP (Page Pair 36, 39, 39/1 & 40), Shasped-lacendiny (BiScha Ge Pair), and Star Shell (Li Geoch L/4,5)	5a,p 41 and 9,pp 4se-5 & 448	
8sh mar AA Guay 3o: 88 cm Fink 36	Used atmos: HE (8.8 cm Spege L/4.5, Spege Pan L/4.5 Kn & Spege L/4.5 ZeZ), AP (F sgr 39) and inc-Shrapa el (Ge Br Sche Fink)	9. pp 438, 444, 446 at 448 and	
88 mm AA Cun 3"; 8.8 cm Flak 57	Same as above	9, pp 438, 444	5"
88 mm AA Gug \$1:	Lond among HE (S S on Supplement A 4 2 mm	446 at 448	٠

Leed amon: HE (8.3 cm SprgrPate L/4.7 FES & SprgrFlak 41), AP with tangetes carbide core (Page 40), AP (PagePate 41) and APC (PagePate

U and HE ammo: 8.8 cm SpigrPair (L/4.7) FES-

Can be seen at the Museum of Abeldeen Proving Ground, Md

Lied anmo: AP (8.8 cm PagrPair 39, 39/1, 39-43, 40 at 40/43), HoC (GrPuir 39 HI & 39-43 HI) and HE (SpigrPair 43, etc)

9, pp 437-9, 441 & 444 and Ref 12

9, p 441

5a, pp 24-5; 9, pp 442 & 447 and Ref 12

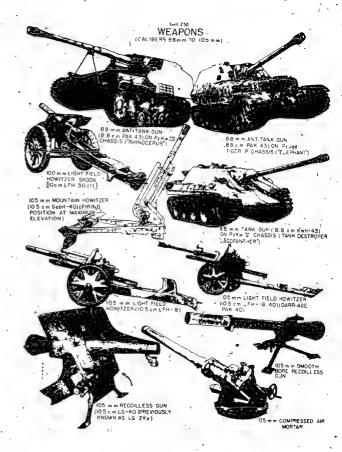
12

88 mm AA Gug #1: 8.8 cm Flak #1

88 mps AA Gus 41; 8 8 cm Fluk 4)

88 pam Short Mortar

88 mm Teal, (sea 43 [ 8.8 cm KwK 43 (L/71) ]

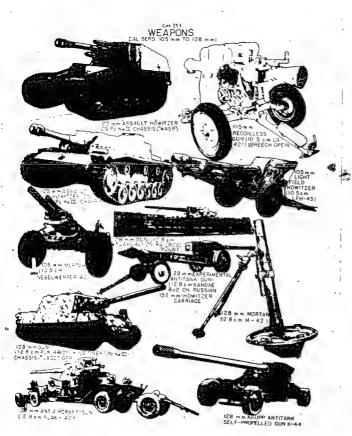


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• •						*
Can'	Ger 251 +			•		
	(Vespens) (Cont'd)				Ger 252	• ,
Califor and Designation	Remarks, Uses and Some Chicacustication	References		A STATE OF THE STA	(Yospens) (cont'd)	
88 mm A/T Gues 43, 43/1, 43/2, 43/3 (8.8 cm Pak 43, 43/1, 43/2, 43/3)	Same na in 60 mm Tank Gus 43	3x,pp 24-5 and 9,pp 442 & 447		Caliber and Designation	Remarks, Uses and Some Characteristics	References
43/1, 43/2, 43/3) 88 mm Self-Propelled Assault Gus 43 [ 8.8 cm Sux 43 (L/71) ]	Same as above		0.00	100 mm Polish Light Field Howitzen 10 cm IFH 14/19 (p)	Used Polish HE steel shell: 10 cm Stgr (p)	5a, p 78 and
Gus 43 [ 8.# cm SmX 43 (L/71) ]		3n,pp 24-5 and 9,pp 442a 447		, 100 min Yumalav Light Field	Used Yugoslav amme: HE (10 cm Sover \$10	9. pp 451-5
86 mm Seif-Propelled A/T Gune [ 8.8 cm Pak 43 & Pak 43/41 (L/71) ]	Same an above	3a,pp 24-3; 9,pp 442 a 447 and Ref 12		100 min Yugonlav Light Field Howitten; ib cm 1FH 315 (i), 316 (j), 317 (l), 317/1 (j) & 317/2 (j);	Used Yugoslav amme: HE (10 cm Sprer 310, 311 & 315) and Shrapnel (Schr 316 & 317)	5 s. pp 76-8 and 9, pp 451-5
82 mm AA Gun (Convermed Runsian 85 mm Gun) [ 8,3/8,8 cm Eink 99 (r) ]	Uadd Russian and Gorman number HE (8.6 bm Sprgr L/4.5) and AP (8.6 cm Page and Page 39)	9. pp 444, 446		. 105 mm (4.134) Light Field Howlener, 16:10.5 cm 1FH 16	Used same: HE (10.3 cm FHGt, FHGrSc, FHGr 38, FHGr 38 Sey FES), HE-1 (FHGrScp-Bt), APV(PSF Rot L, Spar), HaC (Gr 39 Rot HL), Gr 39 Rot HL/E, Gr 39, Rot HL/S a Gr 39 Rot HL/C) and Smoke (FHGr), FHGr 38 Nb and FHGr 40 Deur)	5s, p 71 and 9, pp 437, 461 a 1 470-6
36 mm Rocket Launcher, called, Rehetensen serbisches 63 (6.8 cm RPEB 43), known sino an Rehetenserter 63 oc Otsorahr	This was an entities version of the S.S cin RPuB deaction below, it had no shreld, it send the same summerices as below	56, pp 9-13; = 12, p 521	,	105 mm Gune 17 and 17/04 new patreen: 10.5 cm K 17 at K 17/04nA	Used HE ammo: 10.5 cm FHGr Rot	- 'S p 457
(Stowepape)			C	105 sun Medium Heavy Gun 18: 10.5 cm all 18	Used ammo: HE (10.5 cm Gr 19 at Gr 19 Km 13) and AP (Page Rot)	9, pp 458, 468 & 481
63 we hother Louncher, called B.I. on Not-desponserhiches 54 (R.E. on RP-28 54) or Penserechoods. It was an unlarged version of original Assertion Bonocks. Its operation required two men. This limm- cher was also called Oterothy	Sacoule-bure tube. 24.07 long and weighing 20% lb, exclusive of should. It fixed a shaped charge rective projectif (2.8 cm 1985); 4522) 25% long and weighing about? 15, which practicated ervel turner shoule 50°, its range was 35 re 165 vd and sanutie velocity up to 1200 tri sec. The tunnelse was provided with a pro-	- 3n.p 10, 6.p 308, 7,p 23, 9, pp 243-6, 31,pp 323-2 and Ref 33		105 mm Light Field Howiczens 10.5 cm iFh 1s, iFh 18ahi, 1Fh 18ahi, 1Fh 18/2, iFh 18/39 cm iFh 1s/40	(End Ameno, HE (10.) 5 cm s R(G), PHG7546 PHG735, PRG16 38, PHG 195 G; FES 45 FHG7 1982h, FHG7 195, Serge 45 PG 55/87, 42 Ta, Mindre and FHGF F), MEI (PHG 559 Bb), HGC (Gr 59/RevHJ, Gr 59 Rot HH/A, Gr 79 Rev HH/B Serge 9 Rev HH/C), AP (Fige 1982, Perg Rot 4, Serge 9 Rev HH/C), AP (Fige 1982, Perg Rot 4, FHG70b 39, EHG24b 40 FES 48 FRG7 41Mb). FHG70b 39, EHG24b 40 FES 48 FRG7 41Mb.	5s, pp 71-2, 9, pp 457, 460 1, 464-5 at 470-6, and Ref 12
projectile pus funnched the back blast of fia called later Pannerfuser	jectile guide which was out after firing 300 rounds it effective generator which preduced the accessary space retains Bandon's used Enablight becomes on broading a me wached a length of about 16 ft (See also description	m ignite the pro- spect. Then the of Fauetperson,	1 - 4- 4		FEG. 3915), Smoke (Fighth, Fighth 38 FES, FHGSh) 99, Fighth 40 FES & FMG 44Nb), Smoke indicance (FHG: 40 Dent FES), Incendiary (FHG-Br), Sur (LeGench) and Propaganda (Veiss Reg Gerchoss)	
\$8 mm Recket Lemcher Püppehen; des ignated as \$8.5 mm Rebetenverfor 43 (6.6 cm RW 43), known also as Wheeled Sespeke". The projectile	the second secon	3. p 188, 6. p 199, 9. p 243 and 14. p 322		105 mm Haval Gunat 105 cm SE C/28 ,C/52 m C/93	Used HE and Star shells	5h, mble 3*
"Wheeled Sepocks". The projectile was the same as above except that is was modified for percussion fixing	It was essentially the Perspeccievel; mounted on a light carriege. The rocal weight of lanacher was 140, lb and the effective camp 200 yd. This model was discussioned a before the and of yw 12.	11, p 322		105 mm Medium Heavy Turret Gini 10.5 cm sXT	Used ammo: HE (10.5 cm Gr 19 Kz 13) and AP (Pagr Rot)	9, pp 468 a. 481
90 mm (3.54°) French AA Gun: 9, cm F)ak (f)	No other information gives	54.9.49		105 mm AA Guns 38 and 39: 10.5 cm Fink 38 & Fink 39	Used ammo: HE (10,5 cm Spege L/4,4 & Spege L/4,4 & Spege L/4,4 Kz) and APC (Page Rot)	9, pp 467-8 & 480 & Ref 12
90 mm Yugoslav Mortag 9 cm Gr¥ 309 (j)	Used Yagonia? HE mostar bombs 9 cm	50, p 30		105 mm Mountain Howitzau 405 10.5 cm Gebil 40	Used amout HE (10.5 cm FHGrAl, FHG 38 Al) HoC (Gr 39 Rof HI/A, HI/B & HI/C) and Star Shell (LuGs)	5a, p 56 and Ref 12
94 mm (3.7°) British AA Gunt 9.4 cm Flak (e)	Used British HE seener 9.4 cm SpcgrPatr (e)	3m p 50		105 mm Long Turret Gun; 10.5 cm luk T	Used HE sumo: 10.5 cm Gr 19 Kz 13	94 p 481,
94 mm British Pork Hewitzer: 9.4 cm Gobil 301 (n) (Monetain Howitzer)	, Used British HE same: 9.4 cm Spayr mAZ (a)	Su, p. 56		105 cm Light Gone (Recoilless Airbotne Gone); 10.5 cm LG (Leichten Groundtes) 40, 40/41 & 40/42	Used smme: HE (10.5 tm FHGr 41), HoC (Gr 39 Hl, Gr 39 HL/A Gr 39 Hl/B & Gr 39 Hl/C), Smoke (FHGr 41Nb) and Inc (FHGr Br)	5a, p 74, 9, pp 471-6 and Ref 12
100 nm (3.957*) Guss 17 and 17/04, are design: 10 cm E 17 & 17/04nA	Used same: HE (10 cm FHGr & Gr 15 Hb) med AP (Pagr)	Sa <sub>2</sub> g <sub>2</sub> 79	8	105 mm Asseult Howitzury: 10.5 cm SmH 40 a SchH 42	Used same amno as 105 mm Light Field Howitzers: 10,5 cm 15H 18 etc	_
100 mm Heavy Gue 187 alo cm K 18	Used amno: I'E (in on Gr 19), AP (Page) and Smoke (Gr 38Nb)	5e <sub>2</sub> p 80		105 mm Snioke Shell Morray 401		-5w, pp 71-3, 9, pp 471-2 and 8 of 12
100 nm Light Field Howitzer Lt. 10 tm IFH 18 100 nm Casemase and Tarret	Used HoC assets 10 cm Gc Ros Hi/S and Hi/C	9, pp 450-1 and Ref 12		10.5 cm NbW 40 105 mm Compressed Air Moster	Can be seen at any laneum of Aberdeen Proving Ground Md	12
Guns (Medium): m10 cm RK and KT	Used somet HE (m 10°cm GdP atr 34), AP (PzgrPutr) and Case Shor (KtPatr)	5a, p 79		105 mm Light Gun 41 (Recoillens Airborn Gun); 10.5 cm J.G 41	No description give	12 5e, p 74
100 mm Long Turner Gunz Lg 10 rm KT	Uned amme: HE (10 cm Gr 19), AP (Page), Smoke (Gr 18Nh) and Cane Shoe (Kt)	5n, p 81	h <sub>a</sub>	195 cm Light Gunn (Recoilless Airbome Gunn): 10.5 cm L.G 42	Used among HE (1), 5 cm FHGs, FHGs 38 & FHGs 38, 5sc), Hos (Gr 39 Rox H), Gr 39 Rox H/A, Gr 39 Rox H/C), Smoke (FHGs HS & FHGs 38, HS) and inc. (FHGs Hs & FHGs 38, HS) and inc.	5a, p 75
180 mm Chemical Projector (Smoke Shell Hortze): 10 cm NBW 37	Used HE morrar name: 10 cm War 37	9, p 533	3	# 42/1	HI/A, Gr 39 Rot HI/C), Smoke (FHGr NE & FHGr 10 Nb) and Inc	
100 mi Rocket Lanacher: 10 cm "Penserschrock"	As enlarged version of M am Pauserschreck	6, p 180.		Note: According to Ref 5b, table 7, the reco	(FHGr Br & FHQ 41 Br)	E projectiles as
100 mm Gmm 18/40 and 42: 10 cm X 18/40 at X 42	No descripcion given	5a, p 80	1 1 1	105 mm Light Fluid Hamiston to 5 and	Can be seen at the Museum of Aberdeen	12
100 mm America Mountain Howitzer (Pack Howman): 10 cm Geblinsb M/16 (5)	Used Austriau anmo: HE (10 cm GebGr M/32 and Smake (GebGr M/32Nb)	Sn. p 57	A	1FH 43 105 mm Skode Howitzer (German danijmetion is not given)	Proving Ground, Md Used HE ammo, Nodels 23 and 28	9, pp 478-80
100 mm Light Creck Field Howitzern: 10 cm 1FH 14/19 (s) and 1FH 30 (c)	Used Caech HE same: 10 cm Gr 15, ZI & 30	54, p 78 mad	- /. · · · · · · ·	195 som Belginn Gunt 10,5 cm K 333(b)	Used Belgsas and French ammo	5a, p 81
100 sen Iudian Light Field Howitzers 10 cm IFH 315 (i)	Used Italian HE same: 10 cm Sprgr 315 (i)	9,29 451-3		105 see Czech Henry Gent a10,3 cm K 35 (t), L 135	Used Caseth HE same: 10.5 cm AZGr 35 and also some French and Yugoslav name	5a, p 83 and 9, p 459 & 464-7
	,	Sa, p 77	* */	105 mm Dutch Gust 10,5 cm K 334(h)	No description gives	9, p 459 & 464-7 5a, p 85
	•			shift man Thurch Chang 10 5 cm K 115/h)	find from the " say we see my	

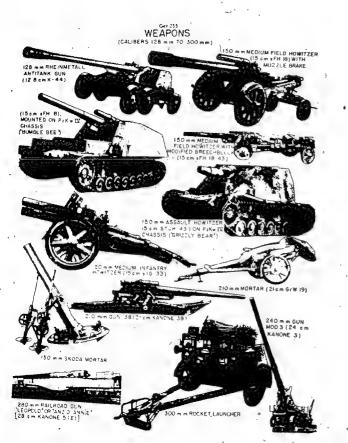
·la5 mm Desch Gent 10,5 cm K 335(h)

Used Dutch HE amno: 10.5 cm KGr 335-(h)



Ger 254 (Weapons) (cont'd)

Calibur and Designation	Remarks, Uses and Some Characteristics	References
105 mm French Guns and Howstsers: 10.5 cm FH 322 (f), 323 (f), 324 (f), 325 (f), 331 (f) and 332 (f)	Used various Franch sinmo	5a, pp 57, 76, 81-4 \$9, pp 459, 461,
105 mm Imlian Gun: 10.5 cm K 338 (s), 105/28	Used Italian HE ammo: 10.5 cm Sprgr 338/11 (1)	5a. n. 63 and
105 mm Norwegina Field Gun: 10.5 cm FK L/28.8 Gock (n)	Used Norwegian ammo: HE (Gr M/15, M/23, M/36 & GrKarrs M/04, M/15 & M/23)	9, p 462 5a, p 78
105 mm Norwegian Gun: 10.5 cm K 427(st)	No description given	. , , ,
105 mm Polish Gun: 10.5 cm K 29 (p)	Used Polish and French ammo	5s, p 85 5s, p 82 and
105 mm Russina Guns: 10.5 cm K 348(r), K 349(r) & K 350(r)	No description given	9, pp 459 & 464-7 5a, p 86
105 mer Vegoeiav Guna and Hewitzers: 10,5 cm   FH 316 (1), 1FH 317 (2), 1FH 317/1 (1), 1FH 317/2 (1), K 321(1), K 336 (1) & K 338 (1) (Schneider) and IGebH 329 (1)	Used Yugosiav, French and Czech ammo	54, pp 57, 77-8, 81 83-5 and 9, pp 435 & 464/7
107 mm (4.21°) Russian Gun: 10.5 cm K 352 (r)	Used Russian ammo	5m, pp 86
114.3 mm (4.5°) Gun: 11.4 cm K 365 (e)	Used British sammo: HE (11.4 cm Gr 365) and Smoke (Nhgr)	5a, p 87
120 mm (4.72°) Mortar: 12 cm GrW42	Used mortar ammo: HE (12 cm Wgr 42) and indicating bomb (Wgr Deut)	5a, p 30 and Ref 12
120 mm Belgion Gun: 12 cm K 370(b)	Used Belgran HE ameso: 12 cm Gr(b)	,
120 mm Norwegian Field Howitzers: 12 cm FH 375 (n) & FH 376 (n)	No description given	5a, p 88 5a, p 91
120 mm Russian Morear: 12 cm GeW 378 (c)	Used Russian HE mortar bomb: 12 cm Wgz 378/2 (r)	5a, p 30
130 mm Yugoslav Field Howitzer; 12 cm IFR 377 (j)	No description gaves	5ap 91
122 mm (5.04°) Russian Guns and Howitzers: 12,2 cm FH 385 (2), FH 386 (1), FH 387 (2), 1FH 388 (1), K 390, 390/1 & 390/2 (2) and aFH 396 (1)	Used various Russian 122 mm ammo: Spigr 572, 574- 377, 380, 381, 384(t), Spigr FEW(t), GR 371 Be(t), Nbgr 385(t), Scht 383(t) and Scht 383/1(t)	3a, pp 88-90 & 9, pp 482
128 mm (5.90°) Self-Propelled Gun 40: 12.8 cm K 40 (Ps Sfl)	Used ammo: HE (12.8 cm Sprgr L/4.5) and AP (Prgr & Prgr 43)	5a,pp91-2/
128 mm AA Gun 40: 17,8 cm Flak 40	Used AP soumo: 12 cm Page FES & Page KPS	9, p 483 & Ref 12
128 mm AA Gun 40M2 12.8 cm Flak 40M	Used AP projectiles	5 h, table 8
128 mm Self-Propelled A/T Gans 44: 128 cm Pak 44, Krupp and Rheinmetall models	Used AP amno: 12.8 cm Page & Page 43	5a,p 25; 9,p 485 and Ref 12
128 mm Light Infantry A/T Gun; 12.8 cm Pfk 44 (Panteringerkanone) also called Tank Destroyer Gan	Used HE and AP projectiles  Can be seen at the Museum of Aberdeen  Proving Ground, Md	5b, table 8 and Ref 12
128 mm A/T Gun; 12.8 cm k 81/2 Experimental	Same as above	12
145 mm (5.709") French Gue: 14.5 cm K 405 (f)	Used French ammor HE (Gr 403) and HE, cost steel (Stggr 401 & 403)	5a, p 92
149.1 mm (5.57°) Naval Genes - 15 cm SK C/25, C/28, L/40, L/45 & L/55	Used HE and Star projectales	5b, table 8
149.1 mm Tempedobout Gim: 15 cm Thus C/36	Used HE and Star projectiles	7b, mble 9
149.1 mm U-Boot Guer 15 cm Uto K 1./45	Used HE and Star projectiles	5b, cable 8
150 mm (5.91°) Long Howitzere 13: 15 cm sFH 13, sFH 13 (5t) apd sFH 13/02	Uned name oiHE (15 cm Gr 18, 19 and Durch Gr 406), HE cant atoel (Stggr 19), HE-A/C (Gr 19 Be), HE Sabor type, HoC (Gr 39 Hl & H/B) and Smoke (Gr 19Nb)	5a, pp 92-3 mod 9, pp 371, 495 m 500
150 mm Gun 16c 15 cm K 16	Used HE howitzer amou: 15 cm Hbgr 16 & Hbgr 16 umg	3a, p 96; 9, p 302 and Ref 12



Get 256

#### (Weapons) (coat'd)

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Culiber and Designation	Remarks, Uses and Some Characteristics	References
150 man Gua 18: 15 cm K 18	Used ammo: HE(15 cmill Gr 18 & 42), HE-A/C (Gr 19 Rot Be), and AP (PzSprgr L/3.7 mHbe)	5s, p a7 and 9, pp 486-7, 491 & 493
150 man Heavy Field Hownczers: 15 cm afH 18, afH 18/1, afH 18/2 and afH 36	Used anno: HE [1] cm K[s 18, Gr 19, &c 19, &c Gr 36 FES), HE cast need [5 kgs 19, HE cs. 19], HE cs. 19], HE [4] (Gr 198b), Rockert Assisted (RG 19), HO [Gr 39 HI), HE, Sabot (Spr 24 TS), AP, Sabot (Frag 37 TS) and Smoke (Gr 18Nb, Gr 19Nb, Gr 39Nb, Gr 39Nb), Si 74 ONN).	5x, pp 93-4; 9. pp 492-3, 497- 8, 506-7 & 509 and Ref 12
150 mm Field Howitzer: 15 cm FH 18/40	No description given	5n, p 95
150 cm Heavy Infantsy Gus (Howisses); 15 cm olG 33 or oJG 33	Used ammo: HE (15 cm Gr 19 & Jgr 38), Rodded bomb (Sueigr 42) and Smoke (Jgr 38Nb)	9, pp 486, 494-3, 497-8, 4, 502 and Ref 12
150 mm Gun 39: 15 cm K 39 *	Used ammo: HE (15 cm KGr 18, Sprgr L/4.6 & KGr 42), A/C (Gr 19 RotBe), AP (Pagr) and SAP (HaibPagr)	5s, p 98 and 9, sp 487, 493, 498 & 504-5
150 mm Railway Gun: 15 cm K (E)	Used ammo: HE (15 cm KG: 18) and AC (Gr 19 Be)	9.pp 493 & 498
150 mm Heavy Turret Howitzer: 15 cm sHT	Used ammo: HE (15 cm Gr 19 & Gr L9 Srg) and A/C (Gr 19 Be)	5a,pp 95-6 and 9, pp 495, 500 & 507
150 mm Heavy Field Howitzer: 15 cm sFH 42	Used same ammo as 15 cm sFH 18	54, p 95
150 mm Gua oa Howitzer Carriage: 15 cakibirst af	Used ammo: HE (15 cm h.Gr 18, Sprgr L/4.5, Sprgr L/4.6 & Sprgr mHbt), A/C/Gr 19 Rot Be) and APC BC HE (PzSprgr L/3.8 mHbe)	5a, pp 96-7
150 mm Heavy Field Hawitzer: 15 cm sFH 18/43)(with modified breech- lock)	Can be seen at the Museum of Aberdeen Proving Ground, Md	12 5
150 mm Assault Howitzer: 15 cm Stuff 45 (L/12)	Used ammo: HE (15 cm Jgr 38 FES) and HoC (Jgr 39 HI/A)	5a, p 99; 9, pp 486 & 491 & Ref 12
150 mm Recoilleas Gun; 13 cm LG 43	No information given	5a, p 95
150 mm Czech Guos and Howitzers: 15 cm E 15/16 (t), sFH 14/16(t), sFH 25 (t) and sFH 37(t)	Used Czech ammo	5a, pp 99-101 & 9, pp 485 & 488-90
150 mm Rocket Launcher	Used 15 cm.HE, smoke and chemical rockets	9, pp 245-7
152 mm (5.98°) Rocket Launcher	Used HE rocket projectile	9, pp 247-8
152 mm Italian Heavy Field Howstrer: 15.2 cm aFH 412 (i)	Used Italian HE ammo: 15.2 cm Sprgr 412/11(i)	5a, p 106
152 mm Russian Guns and Howitzers; 15,2 cm sFH 404(t), sFH 443(t), sFH 445(t), KH 433/1(t), KH 433/2(t) and KK 436(t)	Used Russian design HE, Smoke and Shrapnel ammo	5a, pp 104-7 a; 9, pp 5 10-12
155 mm (6.10°) Belginn Gan: 15.5 cm K 432 (b)	Used Belgian HE amno: 15.5 cm Gr 420 & 426(b)	5a, p 108
155 mm French Guns and Howitzers: 15.5 cm aFH 414(f), aFH 415(f), K 416, 417, 418, 419, 420 & 425(f)	Used French ammo: HE and HoC	50, pp 101-5 & 108
155 mm Polish Heavy Field Howitzer: 15.5 cm sFH 17 (p)	Used Polish HE samo: 15.5 cm Gr 14 & 15 (p)	5 5 n, p 101 °
155 mm Yugoslav Guna and Howitzers: 15.5 cm sFR 427/1 20127/2 (j) and K 403 (j)	Used Yugoslav HE ammo	34, pp 107-8
170 mm (6.69°) Gun in Mortur Mounting: 17 cm KiMrsLaf	Used ammo: HE (17 cm KGt 38 & 39), Incendiary (BrGt 39), AP (Pagt 43) and Stat Shell (Leuchtgeachors)	5a. p 112 and 9, pp 516-17
170 mm Guar 18: 17 cm K 18	Can be seen at the Museum of Aberdeen Proving Ground, Md	12
170 mm Railway Gan: 17 cm K(E)	Used HE amou: 17 cm Sprgr L/4.7	5a, p 112 .
170 mm Austrian Gun: 17 cm K(8)	Same as above	5a, p 112
172.6 mm (6.795") Naval Gue; 17 cm SF L/40	Used HE, AP and Star projectiles	56, table II
194 mm (7.64') French Railway Gua: 19.4 cm K 486(E)(i)	Used French HE, cast ateel proj: 19.4 cm Stggr 486 (f) and 487 (f)	5s, p 113 and 9, p 517

4		G4: 257		1000			. •
	Caliber and Dusignation	(Wompons) (cont'd)		•		Ger 258	
	· · · · · · · · · · · · · · · · · · ·	. Remarks, Uses and Some Characteristics	References			(Wospens) (cost'd)	,
N N	100 mm (7.874°) Light Spigot fortar: 20 cm ll.dgW (20 cm etchter Ladungawerfer)	Uxed HE and Smoke morrar bombs: - 20 cm Wgr 40 and Wgr 40Nb	5n, p 34 and 9, p 534	•	Califor and Designation	Remarks, Uses and Some Characteristics	Arlemen .
	00 mm Rocker Launcher	Used 20 cm AA Rocker		a .	240 nm French Guar: 24 cm K(E) ,; 557 (9 at K 558 (f)	Used French HE cast seed shell: 24 cm Stage 557 (f)	5a, p 123
. 20	03 mm (8.0°) Railway Gun; 0.3 cm K(E)	Used answo: HE (20.3 cm Sprgr L/4.7), Ap- (Page L/4.7) and flare (LeucheGe)	9 <sub>4</sub> p 248 5a, p 114 and	(39)	240'mm Franch Gune: 24 cm K 546 (f) 8: K 566 (f)	No description given	5a, pp 123-3
	03 nm Russins Heavy Howitzers: 0.3 cm H 503 (r) & H 503/2 (r)	Used Russian A/C pmji-20.3 cm Gr 503/2 So (r)	Sa, p 114 and 9,pp 520-2 9, p 518		240-mm Russian Howitzers 24 cm M 364 (r)	No description gives	5a, p 122
	03 mm Navel Gun: 20.3 cm SK C/34a	Used HE, AP and Star projectiles	Sh, table 22		270 mm (10.6°) French Const : Havritant: 27 cm Klase Mrs 585 (f)	No information available	5a, p 124
	09:3 mm (8.24") Naval Gun:	Used HE and AP projectiles	Sh, mile 11		274 cm (10.76°) French Railway Gmat 27.4 cm K (E) 591 (f) and	Used French HE humo: 27,4 cm Gr 593, 594, 595 and 596 (f)	5a, p 124
	10 mm (8,27") Gunut 21 cm (6")2 and	Used HE projectile:21 cm Gr 35	Se, p.116	* .	K(E) 592 (A)	6 4	77, 7 443
. 21	10 mm Morang 18: 23 cm Mrs 16 leavy Howither)	Used A/C pmj: 21 cm Gr 188e	5u, p 109; 9, p 522 & Ref 12		200 cm (11.024') However 20 cm H L/12	Used HE shell: 28 cm Sprge L/3.5	9a, y 124
	10 am Long Horser 18: 21 cm lables 18	Used anne: HE (21 cm Gr 17, 17 ang 18, 18 Seg) and HE-A/C (Gr 18 Be)	Su. to 109 canal		280 mm Conet Hernitzer: 28 cm Kinze H 280 mm Short Breen Gun (Railway)	Same as above Used supper HE (28 cm Speer I /d I) and	54 <sub>10</sub> p 125
	10 am Herror 19: 21 cm Mrs. 19		3, p 523		38 cmKs.lief. (E)	Used mone; HE (28 cm Spegr L/4,1) and HEAP (PxSpegr L/2,6)	54, p 125
21	10 mm Gm 38:-21 cm K 38	Proving Ground, Md		* .	280 nm Long Stone Gue (Rullway); 28 cm Lg Stil (E) Note: According to Ref Sh, table 13, the place	Used HE amount 28 cm Sprac L/4,4	5a; pp 125-6
		Uned HE shalls 22 cm KGr 36	3n, pp 116-15 and Ref 12		280 cm Therefor Bown Gon (Pailments	t and the long Beans guns were 283 mm. Used HE same: 28 cm Gr 59 mHharZ	
	10 mm Gunn 39, 39/40 m 39/41 1 cm K 39, K 39/40 m K 39/41	Used ammor/HE (21 cm Gr 39 a 40), HE-A/C (Gr 39 Be) and SAP (HalbPagr 39)	5a, pp 110-11		280 nm Theodor Souno Gun (Railway); 28 cm ThBek (E) or Behl.		5a, p 126 and 9, p 529
	10 mm Gun 42: 21-cm K 42 10 mm Krupp Gun: 21 cm K(Knapp)	No description gives No description gives	54ap 115	PS 10	280 mm Gno, Model 5 (Railway): 28 cm E 5(E), nicknowed "Languid" and "Angle Annie"	Used same: HE (28 cm Gr 35 & Gr 42) and recker-assisted (RGr L/4,7)	5a, p 126; 9, pp 527-8 and Raf 12
	6 mm Rocket Limnchern: 21 cm		Sa, p. 116		260 mm Guas (Kalluny): 28 cm K 5/1 (E) and K 5/2 (E)	Used HE pages 28 cmGr 39/42 & Gr-42	
	Ag id 42 and others	Used for Imagching various mekers, such as 21 cm RLg, Vgt 42 Spr and R 1000 BS	9, pp 248-9, 259-6 e: 258-60	, ,	K 5/1 (E) and K 5/2 (E)		5a, p-1,27
21	em Men Kutt	Used Cneck seems HE (22 cm AZGe 35) and HE-High Capacity (MinGr 35)	Se, j. 117.		280 mm Havel and Sesconet Gun: 28 cm SK L/50 9	Uned animo: HE (28 on Sprgr L/3.6) and AP (Papr L/3.2)	54, p 127
X.	1 mm (8,27°) Gus, designated 12 ( 120 km respe)	Used HE projectiles	Stymble 22	• • •	280 mm French Heavy Houstners: 28 cm Mrs 601 (f) and 602 (f)	No description given	54 <sub>1</sub> -y-128 —
220	0 mm (8.66°) Franch Guez 22 em 552 (f)	Uned French HE manh: 22 cm Gr 534 (f)	5e, p 117		280 mm Russian Howitzerst 28 cm H 34/35 (r) and H 607 (r)	No description gives	5a, p 127
	0 mm Norweginn Henry Hearitzen om Mrs M 32 (m)	No description given			200 Rocket Launcher	Used HE rocket proj : 28 cm William	9,pp 249-51
	0 mm Polish Howitzers 22 cm birs (p)	Used Polish numer HE (22 cm Gr 40) and	5a, p 228	**	283 mm (11.142") Noval Genet 28 cm SK C/28, C/34 & C/40	Used HE and AP projectile	Shi milden 12
22	o me Yugoslav Howarner; 22 cm hers ())	SAP (HalbPage) Used Yugoslav HE came: 22 cm Ge (i)	5a, p 119		300 cm (11,01°) Self-Propelled	Can be seen at the blassess of Abustons	- 13 - C)
23	4 ma (9,213°) Belginn Howitzerse 4 mm H 345 (b), 545/1 (b) a	No description gives	4 3 4 4 5	¥1.	100 mm Rocket Lanacher, New Type	Can be seen at the Ideacum of Aberdeus Proving Ground, Md	12.
24	3/2(6)		54.99125-20			Used HE cocket proj: 30 cm Wit 42 Spe	9, pp 251-3 and Ref 12
. 231 5K	8 tom (9.37*) Naval Gen: 24 cm L/40	.Used HE and AP projectiles	Jle telbe 12		303 mm (12,00°) Naval and Sentuace Gunt 30.5 cm SK 1./50	Used amono: htE (30.5 cm Sprgr L/3.6) and AP (Pagr L/5.4)	3a, p 129
23	8 mm Theodore Guiz 24 cm Theodor	Used HE and AP projection	5h, mble 12	ara Caract	305 cm Krs (c)	Used Creck amout HE (30.5 cm Gr 35) and HE+High Capacity (MinGr 35)	5a, p 12s
240	0 mm (9,449°) Howitzer 30:	Used anno: HE (24 pm Ge 30 a 30 pm)			305 mm Belgrin Howkner; [30.5 cm ft 632(b)], Rasan	No description gives	54, pp 129-30
	см Н 39.	Used ammo: HE (24 cm Gr 39 & 39 cmg), SAP (Gr 39 Be or HalbPage) and French cast swell HE shell: Stggr 558/2 (f)	3a, p 120		and Yappaniav Gan [ M 638(j) ]		•
240	mm Gmb/. Hodels 3 and 18: cm K 3 & K 19	Used HE shell: 24 cm Gr 35 Mod 3 gen; combe seen at the bluseum of Aberdeen Proving Ground, Md	5n, p 120 and 120 and 12	5 e	310 num (12,397") Giorr Gun on Railway Mount	Can be seen at the Museum of Aberdeen , Proving Ground, Md	. 12
	mm Thunder Brone God (Railway):	Used HE same: 24 cm Sprgr L/4.2 and L/4.5	5a, p 121 and	100	5 20 mm Rocket Launcher (No German designation is given)	Used HE rocket anno designared as 32 cm Wfk	9. pp 253-4
240	om Naval and Sescount Guit:	Used HE answer 24 cm Sprgr L/4.1 and L/4.2	9, pp 524-5 .5q. p 121		340 mm (13.395°) French Guic 34 cm K 675 (f)	Used French amno: HE, cast steel (34 cm Stggr) and AP (Pagt)	5a, p 130
240 24 c	ous Theodor Gun (Railway); cm ThX (E)	Same as above	5a, p 121	~ .	335 mm (13.975") Howker M-1s ; 35.5 cm Ml, kpows also as MI Gus .	Uned A/C among 35.3 cm GrBe, Rū(Rēchling) Gr 42 Be and RöGe 44 Be	50, p 130; 9, p 529 & Ref 12
240	ини Кгирр Gun: 24 ст ⊈ L/46	. No description gives	5e, p 122	<i>39</i>	Note: According to Ref Sh. mble \$4 the M1 am	1 Water 350 meg	. h 175 et l'et 17
	mm Chech Gunty24 cm K (t)	Used Caech HE name: 24 cm Gr 25 (r) and	- ' !	1	365 mm (14.37°) Recoilless Gun; 36.5 cm G 104, developed during WW II by the Rhummerall-Bornig A - G	Not described here because Ref 8, v 5 is confidential	8, v 5, pp 614 at 623
•		, Gr 40 (t)	5a, p 122 and 9, p 525		WW II by the Shrimmetall-Bornig A ~ G	Manhamatal - Jan	* .
					370 cm (14.567°) French Gunz 37 cm K 710 (1)	No description gives	5a, p 131
				NL.			
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	•	•	*				,

	Ger 259	
	(Wedpens) (con't)	( <b>)</b>
, Caliber and Designation	Remarks, Uses and Some Characteristics	References
380 mm (14.96°)-Heavy Spigot Norter (38 cm SLdgeW) (38 cm achwerer Ladungswerfer)	Used HE and Smoke morter bombs: 38 cm Wgr 40 and Wgr 40 Nb-	5a, p 34 and 9, p 535
380 mm Singfried Railroad Gun; 38 cm Sik (E)	Used ammo: Wh.(38 cm Sprgr L/4.5 & L/4.6) and AP (Pagr L/4.4)	5a, p 131
Note: According to Ref 5b, table 14, t	he Siegfried gun was used as a const defence gun	
380 mm Naval Gun: 38 cm 5K C/34	No description given	
390 mm Rocket Launcher (No German designation is given)	Used HE rocker, designated 38 cm RSprgr 4581	56, mble 14 9,pp-254-3
380 mm Rocket Projector (Sturmmörser) mounted on tank; PaKpfWg IV	Con he seen at the Muzeum of Aberdeen Proving Ground, Md	12
406,mm (16") Adelf Gun: - 440,6 cm SK C/34	Used ammo: HE (40.6 cm Gr 40, Adolf Gr L/4.2, Sprag L/4.6 m L/4.8) and HEAP (P=Sprag L/4.4)	5m,pp 131-2
420 mm (16.54") Howitzer called by the Germans Gamma Marsor	Osed Heavy A/C shell: 42 cm #GrPe	
Now: According to S.Ley, Coast Arty J with barrels from 12 to 16 calibers long not quite unifort, some heavy howitzers	, Jan-Feb 1943, p. 16, the word Moreor referred to short medi while the word Housitze was restricted to field howitzers. I were called Moreor, while others were called Housitzens.	we and heavy howitzers the Austrian usage was
420 hat Czech and Russian Howstners:	Same an above	
Elisares Fauntas from portion, while the lost, According to the hove author, the is a member of the filled in sec of each of the second of the lost of	y Journal, Jac. Feb 1943, pp 16-15, the following heavy or come 1/40 RL/45, 21 cm L/190 (Perispershire or Femerace) (cm L/40 RL/45, 22 cm L/190 (Perispershire or Femerace) (Perispershire or Perispershire or Perispershi	16 howitzer [called he were usually called flowers usually called Kohlonkeston (coal colled to as Perispective d to as Perispective La na the Oleko Borthu 5b, table 14
out of the section of	Used HE shell called; Geschone L/41  188 Kad German used; at the siege 198 Kad German used; at the siege 198 A String Construct, shows to weight, 900 mg (appe 177) about 198 Sorring Construct, shows to weight, 900 mg (appe 177) about 198 Sorring Construction of About 198 Sorrin	5a, p. 133; Ref 12 & F.B.Portus, Field Arry J 35, 345 (1945) : "Krope ol, it was ag to other een Proving Ground
tank, BC Ballistic cap (windshield); C Ca explosive; Ho C Hollow charge; How Howin MP Machine Pistol; mus vol muzzle veloc; Seminamorpatering, see second(s), T Tra-	Autrait, A/C Anticoncrete, AP Armorpiercing, A/P Antipe pped; (AP Call automatic pixtol (amountation); h/see feet pe star; less lie (incendiary; lie poundés); hi slodel; sean maximum, ty; ex conce(s); PG Provides (s); his voidel; sean maximum, est; wolume (tola book); hit Weight had be Relevance; penning	rsoanel; A/T Anti- r second; HE High MG Machine gun; da per minute; SAP

					•			1	Feldo 44 Vettersprangeteff.	mpote ffe	•					•	
					1	8		# 1 d	trot detailing of Vetteraphengetoffe	d see aga	126)						
			L	L			1	3	Composition X						_	_	
Designation	212	¥ - 1	PORS	Š	34	r L	- jg. :0	M 1 8	4:1	źź	R chiq edd edd edd edd edd edd edd edd edd ed	233	× = 2 - 3	Other	Remarks	is References	
W. Agend A	27.0			300	1	I	I		T				trate				٦
W-Albie	-	- 1	- 5	9					,	٠.	38.0			Na mitrate	3	2.004	
W- Ammountable is A	2	Ċ	· ·	4.0	 	- Participan	8.0			2.0		20.0			,	• }	
W-Ammoncality is B	67.0	•		9	1.5	3				1.5		200		,	ag-gov		
W-Ammoncahing D)	Mercalia	II, v 3,	p 121 L	S the	as beve	- de 20 91	oeitions	o imila	10 W-Au	noocakiin	- A sali	B and			won - fee		_
W-Arit A	29.9		٠	25.8	1	٠	3.7	7	. ,	•	٠	40.0	•	Glyceria	. 8	-	
W-Arit B	31.0		٠	32		٠.	7	٠	1		·	38.0		Glyceria	. 9	_	
W-Aneralit, A	57.0		٠	12.0	2.0	•	2.0	•	4	6		27.0	,	•	,	_	
W-Astralit of	74.5		٠	9	1.0	,	7.0	٠	١.	1.0		10.0	,	5		_	-
W - Bulducit A	50.0		٠.	22.5	2.0	2.0	•	٠,	•	10.5	,	33.5	,				_
W-Barbaric A	23.0	3.0	•	30.5		0.5	•	'n,			40.0	,	,	Tale		-	
W - Berberit B	24.0	2.3	•	9		•	. •	•		•	,	41.5	. ,				_
W - Bavarie A	\$5.0	ì	٠	12,0	1.0	3.0	,	,	,	1.0	,	28.0	,	Glyceria 1.		. ,	
W - Bavazig B	26.0	,	•	32	,	2.0	2.0	,	,	,	,	28.0					er a
W-Carbonit A	26.5			300	2.	٠,			. ,	,	,	40.0	9		- 1	• ;	
-	92.0	0.0	.5	3	1.0	ď.	2.0	٠	,	1	0.9	,			3		
.ac	67	8.0		300	90		5.0	٠,	, ,	5.0	10.5		, ,		No.	2	
	82.0		0.	900	22		9.	; •	٠,	. 50	. 28	23.0	9, 1	.,	0		
W-Domerit B W-Domerit A (1936)	0,1	.0.2	- 1	4	0.7		2.0	•	.,	,	4.0		,		No.		
				30.0	9.0	; ·			2,0	.,	.,	11				,	
W-Dynamon	94.0		,		,	, ,	,	2.0	,	4.0	,	٠,	< K	Flow 30.0		Explosives (1918),p19	
W-Fårdir A W-Fulmenir	75.0		• •	0.1	2,0	• • •	5.5	• •		25	18.25	, 5			Non - ge		
		1		,	,	-	;							Paraffin 2.5		v 1, p 391	
	5.19	3.0		300	9 9	, o .	3.	0.0				18.0		. ,	Non-gel	284	
V-Lignosis C	42.0 1	H, 43.	125 Ga	4.0	zplosive	bet do	Bot give	o app	-	.;	,	2	<b>4</b> '		,		
	32.0	_	•	26.0 (Ge1)	9	207				3 .	٠.	36.5	23.		¥ 3	, Å	
F-Monakit B	similar to W	2.0	Ammoocal	rs both." Seites	V - Monac	hites as	non-ge	Incinized iven and	orpiosiv.	- di	•	•	,	_	i	ľ.	_

26.5

34.0 37.0

3 3 3

9 9

1 119 1 . . . YOU'S

220

33

Ger 261

~~~~ 222 772.3 30.0 2 2 3 2 3 3 3 Veloc of Deton, m/arc

The explosives of Table 64 were divided Amen ne propries of Table 64 were divided hate three groups:

A. Ammon ne partor Watter springs abothe (Ammonium Nittane Peministhe Explosives), marked in Table 64 above as Non-get (Non-Gelatinous).

B. Hittenglycenin-Wattersprings to Me. (Nitroglycenia Peministhe Explosives), marked in Table 64 above as

Permissible Explosives), marked in 1808 de above 28 Semegel (Semigelationes)
C. Gelatinose-Wottersprongulatio (Gelatinous Permissible Explosives), marked in Table 64 above as

Gel (Gelatinous).

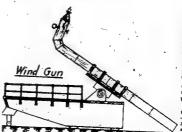
The (A) group included powdery compositions with a NG content not higher than 5% and a density of about 1.0. Wetter Ammoncahusit, W-Astralit, W-Detonit, W-Ligansit, W-Monachit and W-Ventfalit beloaged to this

Lignosit, W-Monachitt and W-Wastellit belonged to this grown. They were sustained for hisaming soft could be sufficient to the (B) group included partly selfations but not plastic expensions occursions in 1.15% of NoR-CC cell and had well as the contract of the country of the

Wayed Emicos'ven, patented in 1895, were based on a minimum of MG and coal tax (crosover), as for instance; and 77, crosses 4.5, called cotton 1.0, Na minute 33.0, ref flower 9.0 and 1.5 and

Wgr 21 am. An air-to-air, solid propellent rocker developed in 1943. Lausching weight 176 lb, overall length 3.7 ft, diameter 6.3° and velocity (all burnt), 1,050 ft/sec.

Witholm Explosives, parented in 1894, were manufactured by Dynamic A - G. E g: a) Am situate 90 and abiline tattrate (neutral) 10%, b) be existe 94 and apphylemine constant 6%. Reference: Daniel, Detriconative, Paris (1902), p 309.



Note: According to Marshall, v 3, p 123, all German coat mining explosives contained a large excess of oxygen. This achieved two purposes: a) it lowered the brisance of an explosive so that the

coal would not be broken into very small pieces.

b) it avoided the formation of carbon monoxide which is undesirable because of its high toxicity, is undestrable because of its high toxicity.

Too large an excess of oxygen also had to be avoided because it caused the formation of attrogen oxides which are pateonous (sithough not as much as carbon monoxide).

References: 1) P.Naoum, Schiens und Sprengstoffe, Steinkopf, Drenden

1) INNOVATION OF SCHERM AND SPRENGERICH, SCHEROOF, Decides (1927), p.147 Scherm and Sprengerich, Steinhopf, Decides (1927), p.189, p.189, p.181-16, 223, 436-39 a. 448 p.181-181-181, p.189, p.

8) A.Stettbacher, Spreng und Schiesstoffe, Rascher, Zü-

rich (1948), p 91. (See also Schlagwettereichere Sprengstoffe and Sicherheite

Wind Gun, developed during WW II in Stuttgart, was designed Wind four, developed during WW II is Strutgart, was designed to shoot a man of nir at an airplane is puch way at to thing it, down. The energy for projecting the air was not nit to be an airplane in the structure of expression and hydrogen bearing a minter of expression and hydrogen and hyd

Wind Tunnel (Windtanal), Many wind huncle were med-ja Germany during WF IL Of these the following were used-for ballinit testing of weapons and ammunities:

a) Supersonic balliatic tunnel-of AVA at Göttingen Windtanal State (Machineller of August (Machineller of Machineller of Machi

of going, to a Machaumber of 4.4. This was the mightiest supersonic wind tunnel in Germany

() Subsonic wind tunnels for texting balliating of bombs belonged to LCZ, near Soutpars.

The formal superson were wind tunnels for testing sirrenfather than the following organizations: AVA at the following organizations: AVA at the following organizations: AVA at the following organization of the supersonal is a fine diameter was not considered to the supersonal is a fine diameter was under consorted the supersonal for the supersonal is a fine diameter was under consorted. tunnels (8 m in diameter) was under construction at Otata in the Bavarian Alps (See also High Speed Tunnels)

Abbreviations: See under Warplance, erc.

References:

References:
1) CIOS Report (1945), pp 28-47
2) L.E.Singel, German Research in World War II, J. Wiley, N Y, (1947), pp-16, 24-50, 131, 140-146 & 154-155.

Wire Command Guidonce System for Missiles. See under Guidance Systems for Missiles.

Witel . The name given to synthetic toluene.

Wohl Dynamics, patented in 1891, were based on the low-freezing NG, which was prend by the nitration of glyceria previously heared with concd sulfuric acid to 130-160° and then cooled. As the result of this heating, some polyglycerines were formed which on nitration gave low efreezing nitropolyglycerins.
Reference: Daniel, Dictionsaire, Pañs (1902), p 811.



WP (Wilricipulver) (Cubical or Prismetic Propellant), A were functional to the formation of Properlisation Against It was first meantful under the name of WPC/BY Widelpulver Construction 1889) by the Yeternage Kölner Rotweeler Pulverfashet in Rotweel, Wintenaberg for the Composition of WPC/BY was assumed to this little of the Rotweeler Pulverfashet in Rotweel, Wintenaberg for the Composition of WPC/BY was assumed to the Italiance (Ref. 1).

Barnett (Ref 2) gives the composition of an early WP as follows: NG 50, NC 50% and small quantity of

Brunswig (Ref 3) given for WP used niter WW 1-NG 38.5, NC 60, centralite; or acardice 1.0 and moisture 0.5%. References

1) 1. Dearel, Dictionnaire des Maribies Explosives, Dunod, Paris (1902), p 811 2) E.Barnert, Explosives, Van Nosmand, NY (1919), p 78 5) H. Brunswig, Das rauchlose Pulver, W de Gruyter, Berlin 1926), p. 136.

WPC/89. See under WP (Würfelpulver)

W-Soln. The name given to Hexogen (RDX) prepd by the attraction of K methyleneaming sulfonate (See under Hexogen) Wüsfelpulver. See WP.

Würgebahrung Goschütz. See Tapered Bore Gun.

R-4 was a fin-stabilized guided mussile with a proximity fuzed wanteed developed especially for use, by fighter planes against enemy bomber formations, it was propelled by a liquid fuel (Tooks 250) and an oxygen carrier (Selbei). Some experimental models were equipped with devices called "Emaich" and "Pudel" [TM 9-1985 (1953), pp 215-19 %

K-Roy Equipment (Rüsigeneinrichtung). A short description of the x-ray squipment manufacturing industry is given in ClOS Report 28-31 (1945). X-Series Guided Missiles. See Rubretabl under Guided

A-Stoff, See Tetan.

Zabel, in 1899, constructed a metallic carridge consisting of two compartments divided by a thin partition. In one of the compartments was a mixture of Ca carbide and Ba peroxide, while the other contained a dilute acid solution, On breaking the partition the acid reacted with carbide and peroxide to form a mixture of acetylene and oxygen which immediately exploded. Reference: Daniel, Dictionnaire (1902), p 814.

Zoitschnur (Time Fuse), called in the US A Safety of Blasting Fuse. See under Fuses in the general section. Zoltachnurzeitzunder (Time Igniter With Fuse), See under Electric Ignitets, of Primers and also in Beyling-Diekopf (1936) pp 175 & 266-69.

Zeff-ligelit was a perous vinyl chloride polymer inminute for use an an outside atmost for the au intake tube (Schnickel) as well as for the periscope in order to prevent the detection of submarines by short waves sent from enemy places

The pores of Zell-Igelit contained nitrogen generated within the material by a special process involving the use of a substance known as "Porofor N". For this a mixture consisting of polyvinyl chloride, 95 and Porotor N 57, was beated in an autoclave at 1 100 and then the mass was laminated. During this process the Porotor N dissolved in the vinyl chloride and reacted with the liberation of nitrogen which formed hubbles inside the material. Each Schnorker tube was covered with 7-8 layers of the above porous laminute each layer being separated from the other by interposing carbon black coated paper, which was slightly conductive to electricity. It was assumed that the incoming short waves from a radar generated convection currents within the cathon paper and these currents were sub-sequently buffered if not completely absorbed by the Imminutes. Reflection of the short wave was thus minimized if not completely absorbed by the insulating mans. Reference: CIOS Report 25-18 (1945), pp 29-30,

Zeilpach. See under Raschig's White Blasting Powder.

Zinn (Tin). See general section. Note According to A.Stetthacher, Spreng- und Schiesarolle, (1948), p 43, small quantities of tin, (or of its easily reduceable compounds) were incorporated in some German NG smokeless propellants in order to protect the inside of gun barrels from emsion .

Z-Solu the name given to Na or Ca permanganates used as oxidizing components of moreir propellants in which T Stoff, served as a combustible composent. A-Salz was used in the Feuerlille type guided missiles called Hecht, Reference: L. Ross, Jr., Guided Missiles, Rockets and Torpedoes, Lothrop etc N Y (1951), pp 45-46.

Z-Stoff C. An aqueous soln of calcium permunganate commining 600 g MnU, per liter 5p gr 1.4 at 20 and fr p. 22. Used as a catalyst, as described below (CIOS 30-115, p.10).

Z-Stoff N. An aqueous soln of sodium permanganute containing 600 g of MnO, per liter Sh gr 1.4 at 20° and fr p-80° Used us a liquid chiefyst in viewid toeset propellants to asset the decomposition of hydrogen peraxide which served as a source of oxygen (CIOS 30-115, bp 8 & 10).

Note: Z-Stoff N was used in summer since its fr p is -3°, while Z-Stoff C was used in winter (fr p -22°). When Z-Stoff C or N is used to decompose the T-Stoff (hydrogen vapor and oxygen some small particles of manganese dioxide. Due to the presence of these particles, the gaseous mixture thus produced is not suitable for driving a turbine mixture disa producted is not suitable for driving a rubine but can be used for other purposes such as in assisted take-off units and an mekets. When it is necessary to obtain a gaseous mixture free of MaQ the decomposition of H<sub>2</sub>Q<sub>2</sub> is conducted by means of a solid catalyst, such as described under MP-18.

Zünder-See Fuze.

Zündersprengkupsel-43. A separate dap and détonator assembly designed for use in some A/T mines in con-junction with a tilt type igniter, called Kippauder 43 [ TM 9-1985-2 (1953)].

Zündkraft. See Initiirvermögen.

Zundpetrononsotz. Ser Cartridge Case Percussion Piffner. Zündsetz (Priming Composition). See Primary and Initiating Compositions,

Zündschnuren zünder (Igniter or Lighter for Fuse). Beyling-Drekopf (1936), pp. 166-69, describes several types of ignitiers. Some of them are intended for use in firehead-jamiters and the several control of the control of the for gaecus manus (für Schlagwertergruben), while others for gaecus manus (für Schlagwertergruben).

2 undstoffe oder Initial explosive offe (Priming, Igniting or Initiating Compounds). See Primary and Initiating Compositions.

Zundversterker (Ignition Intensifier), Ignition of a pro-pellant in 50 to 280 nm weapons was accomplished by means of a primer combined with an igniter contg about 2 g b.acx powder. For larger guns, an extension, called Zundvermarker was liked in front of the primer. This was fulled with large grains of black powder and had a venturi as the lorward end to thow the flame the full length of the charge. There were also one or two small side holes to ignite the cent of the charge as well-Reference: CIOS 31-68 (1946), p ? (See also under Ignation).

Zunehmunder Draff. See Progressive Rifling.

Zunammengunetate Zunder (Camponite Ignitern of Primers, are described in Beyling-Drekop! (1936), p .74.

Zwischmledung, Zwischenzundladung, öder Zwischennumber (Intermediate Charge of Booster) is described in A. Stettbacher, Schiens- and Sprengstoffe, Leipzig (1933), p 352.

Zwischenzunder, See Zwischenladung. Zwischenzundladung. See Zwischenladung.

Adachuse

Andross

Anzeiger

Anzünder

Atmosphise (App)

Atombombe

Arbeir

#### **VOCABULARY** OF

#### GERMAN ORDNANCE, AMMUNITION AND RELATED TERMS WITH SOME . ABBREVIATIONS

(In collaboration with H. A. Tisch and J. F. Hanck of Picetinny Arsenal, Dever, New Jersey)

abachleppen

abschlaudern

abachmieren

Abachräeune

Abschusaroh

Abschaits

Abschuse

sheeben

Abspettung

absorvases

Abstrandwering

as exeverse similar

Ashetellhabbhof

Abwehrgeschüss

Abwehrleuchtzeiches

Abteilung

Abwebs

Abstracelednae H1

Abstandzünder; Radio

Abstrace

Abuchmul adraba

Abschigudermaschine

Mining(ore); dismintling(serocrare); abachiessen

decomposition liberration; figure; diagram

to release gas

Vaste oil

Ricoches

ignites

Disarmana

Fuze cord; lanyard ..

Vacuum deniscom

Priction igniter; ripcord

to break off: cease

Abbau Abbildone (Abb)

abblacca abbreches nbbrem neu abbresses abdampfen; abdus

Abdrift

sbdreckes **Abfallaäure** Abf evera Abfenrongsvorriche

Abgeng Absensufehler Abassaswinkel Abgire abgiosees

abbindlep abkaisters Abkonnen

Abkomerch Abkommachineses abkühlen Abkürsone Ablage Ablagerma Ableakung Abnahme Abashmepritues Abashmevorschrift \*bautres Abnurxung des Robres

Abol Aboraller Abprall winkel Abproduct Abreisekanni Abreiss - schlaufe Abreisa-school Abreinszilodes

Abrüstung Absaugentfeuchtur Abschrider; Abscheidungsvorrichtung

to brake: atop to burn off; deflagrate; finish burning EG GYEDORNE Drift to pult a trigger; fire Wante seid Firing Firing mechanism; release mechanism (Mor) Discharge Jump; vertical jump(Arty) Angle of departure Exhaust cases to cast meral; pour off; decast; spray chem warrace agents to explode; so off: fire of to decrepinate Deviation; point of aim ( of firing) Subcaliber tube (G) Subcaliber firing to cool . Abbreviation Domp; depot Storage; deposit Deflection; deviation Acceptance: decrees as Acceptance ress Specification to west out

Abweighung des Geschos ses) Abweises Abwerfes Bore erosion (G); (see Ausbeen Abwarf nung des Robers) Abwerfhehälrer Abwarfgerat; Abwartvo richtung Angle of ticoches Abvertmenition Waste product; by-product Fuxe-cord button (HdGr) Firing cord loop (HdGe)

Abwurfrauchzeicher Abwur(schacht Abwerfseherehr: zielgerät shzieben

security. Defense gun; AA gun Alarm flare Deviation; drift(Proi) Carridge case deflector protector to drop; jettison Release (bombing) Aerial bomb container Bomb release mechanism Drop ammunition such as aerial bombs, mines, torpedoes and some pyrotech irema Arierafe smoke signal (lit Drop-smoke-signal) Bomb rack Bomb night to pull (a trigger); draw off

to shops down; discharges

Schleudermaschine)

to greage: lubricase

Sector: area

Discharge

colina

Diseases

distance

VT fuze

Partern bombins

Detachment units

Active defence; military

Railroad vand

Radio proximity fure;

Projector (CVS)

to blast; burst

to throw with a aling

Fuze wire: funible wire

Sloping: slopes bayel: rape

to see; nim; take sight as

Prepared hollow charge.

ped with three lege to pro-

vide the desired mand off

Splitting off; cleavage; sepa-

15 kg Hexogeo (RDX), squip-

Centrifuge; catapuls (See also

fice

+to 10\*

mechaniam " Abeweigung Branch; junction (RR) Acetessignither, Acetes sigeater Ethyl acetate Aceteanse Aceric acut Achse Axia: axle Adamsic DM Adolf (Kanone) 406 mm coast defense cappon Aether See Ashes Ago Name of so sircraft manufacturing COMPAGE Abazie Gum arabic Akin Bost type runner placed under gun wheels for operation in deep snow; (also used as a swamp conveyance for wounded, etc) Akkemulator Storage battery; accumulator Aktiengesellschaft (A -G ) Joint Stock Company; Open Corporation Alexapiscole Alasm pistol: blank pistol Trio-wire alarm flare equipment Alarmechusageriis Alax-echusapamone Trip-wire alarm flare carridge Alkelipstruge Alkali - cartridge (ozygen breathing apparatus) alkaliach (alkal) alkaline . Alkalielle: Alkalizielle Alkalinity Alkohol (Alk) Alcohol; ethapol zligemein general: commos Amboas Anvil Ammon Ammonium; emm Ammorriak Ammonie Ammonpul ver Ammonel Ammonium nitrate onsulpeter - Sprengmie Appropriate orplasive Amorce (see also Zundhütchen) Paper percussion cap (toy pistols) Amphibicokambiwaren Amphibian combat vehicle Office; post; employment; business Anfangèdrall Initial twist of rufling Anfangadruck Initial pressure Anfangegechwindiekeit Initial (muzzle) velocity Anfangeladung Initial charge Anfeuchtung Moistening: damping: humidifying Anfeverune Combustible composition in a flare cartridge; ignition Fulminating compound; Anfeuerungssatz booster charge; igniter train Anführungszeichen Quotation marks Aspriff 'Anh): Anhingerwagen Arrack . Trailer Anhydriesierungsmittel Debydration agent Anker Anchor; armature; rotor Ankermine Anchored mine: moored Aniaduag: Primidladung Top (primary) charge of a blasting cap or a Atznatton detonator; primer aussere Ballintik Anlage Installation: annex: aussere Weite (aW) plant; design

Sexuer

Aiming point

Stating (take off) speed

Trigger "

Abzugsgang

Anlasser

Anlegepunkt

Aulaufeeachwindiakeit

Abzugsschour

Abzugvorrichtun

Trigger pull Firing line; lanyard Trigger mechanism; firms Adamsite; diphenyl spinochlomarsine Ansetzer Armee Areio Atemgerat Äther

Annäherung Approximation; approach Anpassung Adaptation Anrufzeichen Call signal Ansauerung Acidification Ansaugung Suction Anschlas Impact; stroke; siming or firing position Anschie sapatrone (See Cartridge baed for also Anwarmeschusa adjustment fire and for and Einschiessgeschoss) warming up a gun; warmer Angehluse Joining; junction; connection; something unnexed; linison Apschlussbahenet Railroad junction Sighting shot ansetzen (dan Geschons) to cam Rammert-camrod (G) en sprengen to blow up; blagt Ansteckmagazio Detachable magazine Anetellwinket Angle of yew Collision;timpules an atilizmen to attack; assault, charge anviateren to take sim; to sight Anwarmeschuse Warming - up shot Anwendung Employment; use Anzabi (Anzi) Number; quantity Anzahl der Nuten Number of grooves Index: indicator ". leniter: lighter Arabid-gummi Gum arabic Work; labor; job Arbeitsgeschlien Roving gun (Arry) Army (a tectical unit shove Army Corps, distinguished from Heer, the Army) Armedrevolver Service revolves Arsenal; Zeughaus Arneoni Areine (CWS) Kind: sort; variety; speciesi pattera: type: banner Artillerse (A) Artillery Artilleria, leichte (A) Light artillery Artillerie, schwere (sA) Medium artillers (lie Heavy) Artillerie, schwerzte (ss'A) Heavy artillery (lit Henvieur) Artilleriewesen Gunneral Ballistics (See also Schiesswesen) Arzoni: Arzonimistel Drug: medicine Doctor; physician; medical officer Aut der Flugbaha Branch of trajectory Oxygen apparatus (lit Breathing apparatus) Ether Athylaraindichlorid Ethyldichlorograine (CWS) Athyldichlorarsin Ethyldichlorograine (CWS) ätzender Kampstoff Blister gas (CVS)

Caustic sods (NaOH)

External Ballistical
External diameter (ED)

Atmosphere

Atoutic bomb

Austall

Ausgang

Ausgleiches

Ausgusamorser

auselühen

asuganA

anaharren

avelösen

Ausriistung

Augachaire

Affestosses

Ausschwitzung -

Suazere Ballisrik

Aussprungwinkel

Aggerpasbuchae

Aggreensaladon

Asseroserobs

Asstrockses

answingen

Auswahl

augwalzen

sucrimen.

Ausweg

Ausveis

Angeories

Auswerrung

ausziehen

Annieher

Automat

brenner

Backbord

Bahabof

Baha

Autofrensee

Axe: Achse

auromatische Mine

Auswitterung

Assessment

Answerchflesche

Abwechselben as

auslöschen

Anningshehel

Ausnahmeladung

Ausfuhrung (Ausf)

Bailding up; structure; super structure, i e sponson and rucres (Tk) synchesis to swell up; puff up aufbauchen; aufbauschen Aufbauchwag Bulge; swelling to coverine: ave no authrauches to effervence anibransen aufbrechen to break up; berst; open u aufdunsten: aufdinster to evaporate Buffer Auffangavorrichtung Call signal Aufforderungsnigual (AS) Light armored reconntinuance Aufklarungspapzer vehicle (See also Panzer-apahwagen) Deconaring (base) charge of a cap Aufledung Aufloalichkeit Solobslity . . . Photographic picture Anfrohma m explode; burst open; blow up Aufplatzes Anisats Rear sight; telescope mount langer; percussion; shock Anischlas Anischlagspuchoss impacy (percussion) projectile. Aufechlaggreente Impact(percussion)shell Aufschlauzunder (AZ) Impact (neccusaion) fore Aufschlagzünder mit Impact (percussion) fage Versogerung (AZmV) with delay Autochlagaunder ober Impact fuse without Versogerung (AZoV) delay delay in anfachrauhen Autopalmag Soliztina un: cleavage (of compounds) to blow (blass or force) anfopspages Semi-fixed amounision Aufsteckmunition aufmeigesdet Aus Accesding branch (of trajectory) Auftaspusks Thew point lunace: collisios Anterelienschwiedisk Terminal velocity: striking velocity Auftreffpunkt Impact point striking point Auttrettwinkel Angle of impact; angle of incidence Autong Elevator Appenblicks la arancanana Augenblick spinde Instantaneous pondelay fute; quick fuse Angenblickzinder mit Insusanaeous fuze with delay **Уегаюметны** Augenreisscoff Lacrimanos (CVS) Construction; dismounting (G) Ausbau Asshauchung Expension,swelling; enlareement Ausberte Yield; crop; puspus Aushläner Deflagration without detonation Aughl Dags Efflorescence Ausbohrung Bored hole; bore of rifle Ausbreauen to burn out rifling; erode Anabrenams des Laufès: Erosion of the hore (G) Rohrabautzung (See also Abautzung den Rohres) Ausdampione Steaming ou

Espansion

Evenoration: vapor

Taking apart, stripping : Auseinsodernehmer Precipitation; falling out Denien: model: execution Exit; departure; start Compensator: equilibrator to anneal; to ignite Lip; spout; casting Lipped morras to temper; harden to extinguish; put out (fire) Ausloseeinzichtung Release mechanism (bombing) Release lever to to uncouple? release See Sonderladung Augustrungskoeffraient Utilization coefficient: efficiency Ausreinner; Feblochuse Stray shot 4 Equipment; smannent; outfit ausschiessen (Lauf) to wear out the gun; to score the bore Cat: notch Exudetion External Batliaries Angle of reflection Smoke canister ejected from projectile on burst to emel, clinipate Expelling charge of a projectile; burater Ejecting tube; surped launching tube Desicestor to weigh out; enlittrace-by weight Choice: selection to roll out to manual: meas Wash bottle interchangeable augwecheelbares Seelen Removable (interchangeable) lines in a gun Way out; outlet Deviation: deflection: determ Proof; evidence; report Ejector (Ord) Valuation; value Efflorescence; detection by odos to extract Extractor (Ord) See Kaltstreckung Automat Automatic mine automatisches Gewehr Automatic rifle; submechine gur Asia Azerylensauerstoff-Oxacetylene torch Amor: Stickscoff(N) Nitrogen Way; soud; mileoud; trainenes

Railroad station

Bayoner See also Seinengewehr!

Bajonéttverbindune Bayonet joint Bake Beacon; navigation guide Balkenlaferre Beam gun calriage Balkenwage Beam balance ballistipcher Buiwen Ballistic coefficient ballistischer Pendel Ballincic pendulum Ballon Balloon; carboy Bondelier Bandoleer; shoulder-belt Bár Bear (One of the tanks)(See under Panzer) hasisch(bas) basic Besserie Battery(Arty); accumulator Bauart Type of construction Baujahe Year of construction Boumegrad; Be Degree Baume; Be Baumwollab/ell Cotton waste; cotton linters Baomwolle cotton . Bausolder Soldier in a construction unit Beamter: Beamt Official; civil servent Bene spruchung Strain: straining Becher 1 Beaker Bedrenung Gun squad; gun crew; service Bedruckung Printing; impression Belebl Order: command Befruchtung Moistening: dampening Begieitanilleri Accompanying artillery Begleitgeschütz Accompanying gun Behalter Container; gasoline tank Beharryngsvermögen lacris; force of inertia Beheizung Heating Behelfuming Makeshift mine Desheft Supplement (The word in some times used in cities in journals such as Kolloidchemiache Seibefte) Beihilfe Help; assistance Beiladung Supplementary (increment) charge (such as in don-fixed ammunition); booster charge; ignition charge . .. Bein ' Leg Beispiel Example Beingganne Nippers; pinchers Contributon; share Side car-Bestrag Beiwagen(Belw) Beiwatt Coefficient Beize Corrosive; corrosion Bekapselnider Patronen Priming(of cartridge cases) balsen) bekapselte Hülse Primed carridge case bekunfein. to copper Beladens Beledung Loading; charging; load; cargo Belagerung Siege Belagerungsgeschütz Siege guo Belenchtung Lighting; illumination Belsien Belgium Belüftung Ventilation Beavin Gasoline Benzol Benzene Brobachtungamine Observation mine Beobachtungspatrone(BPatr) Cartridge with a amoke producing projectile used for adjustment fire Beplaceung des Zündern) Fuzz can. Вета Mountain Bergert; Bergben Bab) Mining .:

Beute Bental

Ger 268 Berger-Maschung Berger-type smoke accor (Za dust 40 and hexachloroschane 60%) Berggeschütz(BG) Mountain gun (See also Gebirgsgeschütz) Bergmann Minet Burgwachs Mineral wax: ozocerite Bergweck Mine(coal, ore, etc) Bergwerksprenamirtel Mining explosive Bergwerter Damp (Mining) Bergwolle: Steinfleche Mineral wool; asbeston Asbess Bericht Report; notice; information Bernstein Amber Bernsteinenung Succipie acid berittene Artillerie Morse amillers beraten to burst; explode Berücksichtigung Consideration; regard Beruf Calling; occupation Besatz Steenming; temping(See also Verdämmen) Beseczuna Garrison; crew Besstaungabeer Army of occupation Beachadigung Damage: injury 1 Beschnifung Procurement A division of Hecreswaffenant in charge of procurement of amterials and finished arricles) Beschäftigung Occupation; business beachleasen to proof fire: to cannonade Benchilasune Bumbandment Beachuse(Bs) Firing-shooting; proof fire Beachusenerman (RePeru) Proof round (high pressure) beschuss-sicher bulletproof beschützen to protect Beselversteg Footbridge; hasty treatle (named after General H. von Beseler: 1850-1921) Besstaungarmer Army of occupation beaunders(bea) especially; singularly bespanntes Geschuts Horse-drawn gun Beasemeratabl Bessemer steel Bestand Stock; (supplies; equipment); inventory; strength Bearandigkeit; Stabilitat Stability (See also Haltbarkeit) Bentätigung Confirmation Bestimmung Determination bestreichendes Fenes Grazine fire Arty YSee also Strichfeuer) Bestückung Armament(AC or Jk)(See also Bewaffnung) Beton(Be:Bet) Concrete(made with cement) Betonbombe(RetR) Concrete bomb Betonbunker Concrete pillbox-Betongranate(Betgr) Anticoncrete shell(See alec Grammte Beton) Betonturn Concrete turret(Fort) Betriebanninge Plant: works Betriebnbereich Limits of operation Bettung(Bett) Platform(RR G); bene (Fixed G); foundation Berrungsgeschütz Platform gun Booty; captured material: loot Beutegeschütz Captured gun Bag; pouch

beweglich Flezible gun beweglichen Geschutz bewegliche Schnibe Moving target bewegliches Maschinen ---chine sun Beweelichken Bewegungskries Mobile warfare Bewetterung Bezick(Bez) District beziehungsweise(baw) Bezug bezüglich Bild . Image: figure Bildungawakan

Bigitestelast Biwak blest blanke Walfer Blacesgriff blasenzishender Kampferoft Biati Bläzzehen Blattchennuteer BIP! Blaukraus(BIK) Blaupause Blausante Blech BleckKiches Biol bleichen

Beutelkartusche

Bewaitsong

Bindemettel

Bleiseachoan Die imante legachoes Blendbombe Bleede Blandkörper(BK.1)

Bleidrakt

Blendungsschiegsses Blindganger: Bodenkrenie blindgelades blinderladena Gennara Blinkgerne Blinklampe Blitzkrieg Blirslichtbombe; Blirgliche cylindrische Bombe(BLC)

Blirzachova Blockverschings Boden

Bodesabetsadazinde Bodenn breche Bodesanlage Bodenniefschlagzunde (BdAZ)

Propellant charge in a bag Armament; equipment mobile; movable; flexible Mobile if lexible | ma-Mobility: maneuvershiliry Ventriation (Mining) respectively: or Datum; reference; relation referring to: with reference to plantic; (lexible; ductile Heat of formation Binding agent or material: adherine Dinitrotalwead Birouse bright; clear; smooth; black Hand wespons; armes bianches Cloud attach; cloud ass attack Vesignes asent(CVS) Leaf: blade: sheet Lamine; leafler; flake; lamelle Rectangular flake propellant Blue cross(sternutators XCWS) Blueprint Hydrocynnic seid/HCNVCWS Sheet metal Sheet metal containeri tin can Load to bleach: whitee. Lead wire(used for decoppering gun tube) Load bullet Lead-inchered buller Dunnie bomb Gue mantler; gue shield Frangible glass muoke grenede: glass bottle econode Smoke-screening fire(Arry) blind: dull: inert loaded with black ammorrish Blank shell Signal lamp Blitz wart lightning war

flash bomb, cylindrical Lightning protection Block action; block-lock Ground: Parch: base: postulas: for bombe (such as described in TM 9-1985-2, p 1177 Base delay-action fame Ground defenses AA defense Ground installation Base percussion faze

Photoflush bomb; photographic

Bodenkammer der Granate Bodenkammerladung Bodonkummerachrapa'ell Bodenkanzel Bodenkappe Bodenkrepierer. Bodenlaferre/Bola) Bodenplatte Rodentand Bodenreissender Nülen Bodentang der Patronen feelid Bodenechwanz Bodenstiere. Bodenziel Bodensunder(BdZ) Bogen: . Bogenschuss Bogenspitze Bohrgeschoas Bohrladung Bohrloch; Minescohi Bohrpatrone Bohrpatrone 88 (BhiPair 88) Bohrpatrone 02(BhrPatr 62) Bohrpetrone 28 (BhrPatr 28) Bohrang Soluen Bolzenblech

Bolzenbüchse Bombard Bombardierung: Bomb ment Bombe in Felder eingeseile

Bomb mit Verzugnneit Bombenahwarf; Bombenauslösung Bombenbündelträge:

Bombenfallkurve; Bombenflugbaha Bombenkoof Bombenlass

Bombenschacht. Bombensplitter Bombentorpedo Bombentrager; Bombengal-Bombenvisier; Bombenziel-

Base chamber; tear burn of a projectile Sase charge(Ammo Shrapuel with rear buriter Ball surret; ventral turrer (An) Bear cap bottom place

Ventral gun mount (Ap) Base place (Mar) Flange; rim Split base; suprured base (of a cane) Rimfof a case)

Tail(of a bomb): breech and; breech ring(G): butt assembly (MG) Outrigger support (G) Ground turget Base decounting fuse(BDFz) Bow; are; bead; curve Curved fire; high-angle fire Ogive (Amno) APHE projectile (HE chairs

exploded after the armor or concrete was pierced) Borebole blusting charge Bosehole Blanting cuttridge; prepared charge; demolition charge

Demolition cartridge type 1888 (containing piceic acid) Demolition carridge, type 1902 (containing 75g of TNT) Demolition cartridge, type 1928 (containing 100g of TNT) Bore; caliber Bole; pea; striker; firing pin:

crossbow belt Washer; muette (Arty) Compressed air aus Great gun; bombard Bombing; bombardmen

Segment bomb; fragmentation bomb Time homb

Bomb release Bomb chaster carrier; cluster

adapter . Bomb projectory

Bomb nose Bomb.load Bomb fack Bomb fragment Torpeds book Bomb carrier; bomb rack

Bördelune Bordkanone(BK) Bordinfette(BL)

Bordinad Fackel, weine Bordmenition Bordwaffen !

Borsaure, Böschungswinkel Bouzeille; Flanche Boxe . Brand(Br) Brendbombe(BrB) Brandbombenbändel Brandflasche(auch as % and % liter)

Brandxeschoes (BrG)

Branders naged Refin Brandgranace mit Leuchtopus (Bras ml. 'sour) Brandgranate obse Leuchtsper (Brar of 'apur)

Brandkuchen Brandloch Brandmittel; Brandstoff **Brandmunition** 

Brandkernzeachoas

Brandpanzergranace(Brpzgr) Brandpfeil Brandpatz-Brandpone

Brandsprenggranace(Brapege) Brandstub

breadwirkend Bramade Braunkohle Brausierung Braunstein

Brauepulvet Вгацие Brechuna Breite Breitenfeuer Breiten etrenang Bremse. Bremsroh brennbar Brenadane

Breungemisch

Branageschwiedigliei-

Bomb fuze Boat; hull(of a flying boat) Crimp; crimping Gun on ship or airplane Gun mount on ship or air-

Beach flare, white Aircraft ammunition Aircraft armament; tank armament Botic acid Angle of slape Bottle Submarine pen Fire; incendiary; gangrene. Incendiacy(Inc) bomb Cluster of incendiary hombs Frangible incendiary greender

glass bottle locendiary grenade;

Incondiary bullet; incendiary projectile Incendiary shell Incendingy shell with tracer

Incendiary shell without Macer Incoodiary bullet

"Molotov Cockenil"

locendiary composition Vent: flash hole; flame passage Incendiary Agent Incendiary ammunition AP lac projectile Incendiary acrow Incendiary composition: Incendiary filling HE-lac projectile Incendiary sod (used for destruction of documents, etc) incendiary Liquid used in secoil mechanism Ligaite; brown coal

Burnishing, browning Manganese dioxide(lie Brown stone) Brown powder Effervescence; shower Breaking; refraction Width Sweeping fire See Queratreums Brake; buffer(also Rohrbremse) Brake rube combustible: bumable Duration of burning: burning time(Fz. etc)

Liquid combustion mirrore.

such as gasoline

Burning resu(Fa. 494)

Brennschluss

End of burning

Note: According to W. Dornberger, V-2, Viking Press, N Y (1954), pp 9-14 the above word in used in liquid tockets to signify the moment of disappearance of the flame issuing from the tail of a rocket. The English term "all burnt" is not correct, because at Brennachluss considerable quantities of fuel may still be left in the tanks.

Brenastoff

Breenzünder(BZ)

Brenngunder 74

Brenz-, "-Brenzcatechin Brenzweinsäure Brettstückmine brisanter Sprengstoff: Brisanusprengaroff . Brisanz

Brisanzgranate Briganizmunition Brisansschrageell Brisanzsprengstoff; Brinen apulyer

Bromben sylnyamid Bromayan Bruch Bruchlandung Bruchprobe

Bruchstück: Solitter Brücke Brückenglühaunder

Brückensünder Brumber

Bruno N Kanone

Bruntachild Brustwehr Bruttogewicht B-Smff

Büchnet Bib

Büchsenkonserven Büchsenpulver Bug : Büsel Busseschück

Buchse(Bu)

Fuel; gasoline; Diesel fuel; combustible Powder-train fure (Sh) timb fuze(HaGel(Lie

Burning fuze) Friction type igniter (4% seconds) Pyro- 4 Pyrocatechol Pyroramarie acid Pressure-board land mine High explosive: disruptive (briennt) explosive Shattering power; briganor High explosive(HE)shell HE ammunition

HE shrappel NE: brisant powder Brombeasyleyanide(CWS) Granogen bromide(CWS) Fracture; rupture; cras (of a plane) Crash landing Breaking test Francous Bridge; pleeform Electric(bridge-) wire of blasting cap (lit Incapdescent bridge-wire igniter) Bridge-wire igniter; electric blasting cap Grizzly Bear (SP weapon)

(See under Panzer in dencriptive part) 280 mm Railway Gue (See. under Weapons) Breast shield (G); chest

protector Breastwork; parapet Gross weight Broms ceton (CVS) Pushing; jack; socket(Rad) Shotgun; canieter; tin can; 'siffe Büchsenhandgranste 42(\*) Norwegian, box type, hand-

eranela 42 Canned food: canned ration Rifle propellant Bow; front; pose

Trigger guard , Bow gun; front gun

Turret heach(Tk) Bugpeaser Dachluke Buna tire; ayarketic rubber Dempf Vapor; steam Dämpler Damper; flash hidee(G) Bend; tie; bundle; alliance Dampimaschine Steam engine Bûndel Bundle; cluster(bombing) Dampfrohr Steam pipe Concrete emplacement: Demofapanguas Vapor pressure concrete pillhon; shelter: Darstellung Preparation; production; aubmattne pen manufacture vericolored; bright; dazgling Dauerfauer Continuous fire: automores Bunckromburniting Ammunition used for Suntkreus fire; fire for effect Bustmunition schiessen (97) (lit Multicolored Dauerprobe Resistance test: continuous cross ammunition) (CWS) Simultaneous firing of different poi Buntkreutschienen son gases from separate guns. The Endurance test of a barrel Dauezprobe eines Laufen guase used were a mixture of Veine-krean, Geibkraun and Grünkreun, Dangerschungfoner Sustained or automatic fire Deckblänchen Top wad: overshot wad sometimes together with Blankreus Deckei Cover ' Buntrauch (Breer) ne Schwerzkreva (CWS) Deckung Cover, shelter Suntachinana Shooting with HE and chemical Deckungslech Foxhole abell. Degen Sword Busmin Сопрема Debavou Extension; expansion Dure Deich Tuber vat Dyke Demolferance Demolisie demontjeren; von des to dismonst a gun Colcinegrad(C) Lafotte nebmen Contigrade Demountable projectile Cr -Seet Democtiergeschoes Cyanogen bramide(CVS) Desitrierong 'C-Grechous Streamlined shell Desitration Chousses Detonation adruct Highway Blast pressure Chemie Detoestionsfähigkeis Ability to transmit detenation Chemistre Chroische Kopplandi Chemical warfers agents (CVS) throughout the mane of an chemiarhametanianha Chemical-mechanical (gaiter 4) explosive, no determined is Zünder 41(CMZ 41) Germany by the "Four-Carrillee chemischer Erieg Chemical warface(CW) ·Tent" chemischer Zunder "Bluet Deconationsgrachwindig. Velocity of detonation(expressed Chemical crush igniter "Buch" chiffrieren to cipber; code is meters per second) Chlorania Chloromine-T (CWS) Chlorarcinhampletoff Detomation stemperaru Diphenylchloracoine(CWS) Temperature of deconation (Clark D Detonationaübertragung Ability to transmit detonation Chlorateprengaire Chiorete explosive by infinence from one curridge Chiorneyrophenou-Chio Chlorec emphenose Chlor to another placed some distance pikela-Loome away (no determined by the Gup ealution(CWS) Test described in the general Chloreyes Cyanoges chloride(CVS) section) Chlorges Chiprine pas(CVS) Detonacionswelle Same as Explosionswells Chlorkalk Deconsor Chierinated lime (CsOCL) (CWS) Detonates Chlorkohlynoxyd Phosgene; enrhonylchloride(CWS) Chlorpicnia(CWS) deuten. to indicate; explain; interpret Chlorpikris Deutgeschoss(Deut-Projectile giving on a burst a Oloranifosasinos Gesteht Cilorationic scid(CWS) cloud of solored smoke serving Chlorvinyldichlorardia Lewisite(CVS) as indicator; indicator projectile Chlorusperesoffsaure Hydrochlosic acid Clark I See Chlorusinkampfstoff Deurphtrone(DeurPatr) "Indicator carridge(such as for Clark Il; Cyan Clark See Cyanchlorssinkamoissoff greasde pistol) Genetrucksion/CYald Deutschmark(DM) Type; pattern; brand (See also See Reichemer spelling) Dentung Konstruktion interpretation; explanatio Dichte; Dichtigheit Dessity Conto Dichtpag Accomes Packing; joining; obtacation Comma Dichtungsdeckel Cone Sealing cover(See also Creachiococciahamatana Diphenylevanersing(CWS) Fliessdackel) (Clark II) (See also Schwarzbreum) Dichtung splatte Obturning place Cynamasocratoff Hydrocymic acid Dichrungering Obtuenting sing; gas-check sing dick thick: deape. dickwardig. thick-walled Dienaswalle Service wespon Digirkolnitras-Billerchen-Diethyleneglycol diniurace (DEGDN) flaked propellant

Diglykolnitratpulver(Dig P) Diphenylchlorereie Diphenylcyenerain Diskurhanderange Dobgerät Docht Wick Do-Gerer 38 Dolch Donaritpatrone 100 g Doppelblichse Doppellafette doppelläulig Doppelaunder(Dopp Z) Note: Fase which contains called Pulverbreanzunder Dorn (Kanone) Draht(D) Wire Deshtnets Drabtrohr Drahtschere Drahtzange Drall . (gleichbleibender Drall) (morbmender Drell) Drallabweichung Seitenabweichung Drallinge Drailwinkel Drullrüge Drang' Dreh-Drehbank Larbe Drehkuppel Drehocheibenlufesce Drehturn Drehverschluss Drehzahl. . . Drehzahlmes ser Drainchalalette Dreibein; Dreifusa Fripod Dreibeinlafecte Degiergemisch Dreifachzünde time) Dreifus alafatt

DEGDN propellant See Chloracsinkampferoff Diphenylarsine Cyanide, called also Cyanchiorarsunkampiamif p 223) Dakger fuze ... rifline)

Hand greende in the form of a disk Launcher for firing simultaneously up to 65 rockets. such as Taifun(TM 9-1985-3. Launcher for 150 mm rockets (15 cm Wurfkorper 41 Spreng and Wurigranate 41Nb) Demolition cartridge with 100g of Donarite Double-barreled siffe Two-barreled mount double-barreled Time, and percussion fuze (lif Double action fuze); combination wder-train ignition element in Same as Sevastopel Gun, called also Gustav Geachütz Wire net; wire mesh Wire wound gun barrel Wire cutters Pliess(for bandling wire) Rifling twist (is a gue); apin (of a projectile); pitch of silling (Uniform ewist) . (Increasing twist; progressive Drift (due to spin of projectile) Leagth of twist(rifling) Angle of rifling; pitch of sifling. Grooves(Rifling) Throng; pressure; impulse Rotary; rotating Revolving curols Gun carriège on turntable Revolving turer Revolving breech mechanism Number of revolutions per minute (rpm); Tachometer Tringial mount (G) Tripod eus moust Triple mixture (gasoline 50, benzene 40 and alcohol 10%) Triple-action fuse: combination fuze (auperquick, delay and Tripod gun moun

Dřílluna Three-barreled/hunting gun, , usually with two smooth bore and one rifled barrels Druck Pressure; compression; print Druckbolzen Buffer hole Druckfestigkeit Compressive strength Druckknopfatiader 42 Pushbuttopwocket tenter of soap igniter, partern 42 Druckkusel Land mine operated by Dressure Druckwelle Pressure wave Druckzinder 35(DZ 35) Pressure fuze; pressure ignite. push igniter, type 35 D-Stoff Dimethylaulfate(CWS) Dumdum Geschoss(DdG) Dumdum bullet Dunkelkammer Darktoom diàna thin; dilute; slender Dunge Vapor; haze; smoke; fine short small shot; dunas abot" durchbrecken . to break through; pierce durchbrennen tuo anud on Durchbruchkamplwagen Land cruiser (lit Breaking through combat car) Durchdringung . Penetration durchinden to load(a magazine or Bell) Durchmenner (/) Diameter Durchschiessen; Durch-Perforation schung Durchschlag Penetration; filter: screen punch; carbon copy. Durchschlagkraft Force of penetration: perforating power Durchachniss Average; mean; cross section Durchschnittpanzerstärke Average thickness of armor Durchtränkung Saturation; impregnation Düse (Dit) Injectory jet; nonzie; (voor (Rocker) Düsenjäger Jet-fighter plane Düsenrohr Blast pipe Dinenwaffe(DuW) et-propelled projectile, such as Pangerfauer (lit Vent wespon): Dynamitgeschüts Preumetic gun phooting projectiles filled with dynamite 150 E-100(Pager) One of the heavy tanks (See under Panzer) Foha Comer; angle Ei (pl Eier) Egg" eichen to calibrate. Eichung Calibration; ajustment Eierhanderanate Egg-shaped hand grenade: pineapple handekrenade Einabzűg Single trigger

Incineration; complete

Mounting: (netallation

combustion .

Annault fire

Evaporation

Einlischerung

Einbruchsfeuer

Eindämpfung

Einbau

Espendanagenchitz

Eisenbahanaubitze

E senhahananarawa

emplindliches Aufschlag-

emclindlicher Kopfzüg-

Endgeschwindigkeit

Restgeschwindigkeit

Enternungsgereit Entfer-

emplindliches Zunder(EZ)

sinder(EAZ)

der(EKZ)

Enddrall.

Endo

Enge

Enddruck

Endwucht

Egreaflinge

Entferaung(E)

Ersenbahalaferte

Eindicker Erndrehung & 2"nd/ Sene der Patronen histor eindringen Eindruck einfach Einfallwankel Einfeuer Eigflusarchi eratühren Eingung Eingungszöndung Emglessung Ernbeit Elubertageschoss Einfeitegeschutz Ennheitugewicht Einbestagranare Erobeitemunitios

Einbeitewaffe Linkerte zunder Einlage Einlagerung Emissige web Era le serohr Einpreneen den Genebungen in die Züge

Eigheitspatzone

Elabeitepulver(EP)

einractes einrich ten Einrichtung Eigaäuerung Einschlensen Einschiessgeschonn (See

sire Asschiesspatrons and Aswigneschuse) Einachienaziel Einschiffunn Einschlag Einschnitt. Lipschusp elanateen Einepeitzäüse' Mastecklauf; Einsteckrobt Einstrehmegazia

cinerelles. Elastelling: Stelling Eintsuchrefraktometer einvinteres

Einzellademesazia Einzelleder

Eigzelschuss Einzelschus sie ver Einzelsternpatrone

Eisesbahn(E)

Мороріале Slot; groome Neck of the cartridge case

to penetrate: press in: infiltrate - venbahnachiene Impression Einenberonbau simple Angle of impact Eisenblech Single shot fire Eisenwalze Inler vipe Einmine(EinM; EnMi) to adont: introduce (See also Flaucheneismine) Entrance; introduction Francisco Printing charge . Elektron . Pourting un Unit; nam, Flofens Standard projectile; combined shell Universal piece : dual-purpose gua empliedlich

Specific gravity Combination HE and shrapaet shell Fixed ammunition Standard certridge Standard propellant (See descrip tive section) Dual-purpose wespon Standard fune; combination fune-- Emofinettichkeit in war Score se Single barrel gun Subcalther tuber Tine

Forcement of a projectule into cifling; cogenving to engage; rum home; lock to adjust(fire, stc) Installation: establishmen Acidification Adjustment fire; trial fire; targer(range) finding

to commit; insert

Injection pozzle

Detáchable magazine

fire: tune in(Rad)

Adjusting ting(Fa)

immersion refractometer

Single-loading magazine(for

Single-loader; single shot

Single shot; single round

Single star cartridge

Railroad(RR); railway

Single shot fire ( in contrast

adapter

to night in

Wesper

to bursts l

(epeating fire

Subcaliber tube; insert barrel;

to adjust of set(Fs, etc); crose

nungamerker, Entfer-Range finding bullet; projectile QUOSE Sel Ber used for adjustment fire; round to Entietetres locate target: "warmer" Enthamuse Adjustment target Earflammusesper Emburkation Entgiftung Impact: strike entkupiero Notch; cut Earkupferungsmittel

> englaszen Entlastungszunder(EZ)

entlüften Entrigaelune ensuchariero (Zimder)

entrichera

Enteicherungeflügel entspannen eutwaffnen ' COLASSEED OF Entwasserungsgraben entzunden Entzundlichkeit Entzündungstemp

Railroad gun Railroad bowezer Railroad mounting(G) Armored suiteond train Rail Reinforced concluse construction Sheet Boo tion coller (in clearing of mines) A/P bortle mine (lit Ice mine)

White of egg; albumin Electron (trade name for Al-Ma alloy) "Elephant" tank deutroyer (See under Panzer in descriptive part) aconitive

Superquick impact face

Sensitive type of PD, Fa: all ways func Superquiek fuze; high-sequitivity fuze (See also Schoellzunder) .

Sensitiveness; sensitivity Terminal swint of cifling Firial pressure End: limit: remination Terminal velocity; remaining velocity Remaining energy Narrowness Hosesess Duck gun

Range; distance (See niso Schussweite) Range finder; range indicator

Desideaus Inflammation; flash Flash reer Detoxication; decontamination(CVS) to decopper.

Decoppering agent (such as Pb wire) to relieve (of pressure) Antilifting igniter (with HE charge)

to ventilare; to bleed recoil merchanism Unlocking to unprime (Fx) to disengage or release the safety device (Vp): to arm or to activate (Mi ot B) Arming vane(B) to uncock; to relieve tension: to let the fixing pin down to disarm to free from water; dehydrate

Deninage ditch to ignite . Flammability . Ignition (inflammation) COMPUSATION

Erdartillarie

Erdnice: Landmin Erdől -Endniel Eeforochung

Ergionnag Ergebaia Erbitzung Erböhung Erkensung Erkillrung Ermiduagakamptemit Ecmidungsschieszen Erprobungsplatz; Walten prilimanplace Econta/EcySee also Sugragac) Erseigsprengstoffe(EsS) Consequelick (Ecst)

Erechützerung Erstatrung ererickender Kampfaroli Erwärmung Erwelchung erwidern Erwiderungsfeuer Erz Brzeuge

Erantsteil

Enche Esse Essig Essignithes Eauigenint Esnigsäwe ... Exertierhombe(ExB) Exerciorgeschoss(ExG) Exerzièrmarach Exercicemunicion Evidue Exerxierpatrone (ExPatr)

Expansionsgeachoss

explodierber explosibel explodieres Explosibilität Explosionedruck Explosionstähiakeit Explosionageschoss Explosionakrafe; Explosivkruf t Explosionuiross Explosionstemperatur Explosionswirms Explosionswells

Explosive impact ' Explosion temperature Heat of explosion 2 Explosivgeschoss Explosive baller Explosivatoff Explosive: explosive substance

Artillery used against ground targets Exaudat (as distinguished from AA Arry)

Earth; soil; ground (electrical) Fabrik Fach Fackel Fades Fadenpulver fahrbar Fabrer Fahrrad Pahezeug . Fallhöhn Fallkeasel

Detection: recognition Explanation; declaration Harassips agent(CWS) Harausing five; gan-shell fare Proving ground; place for resting WERDONE Substitute; replacement; synthetic material; spare pare Substitute explosive Spare part; inert piece resembling in appearance a fuze found in front section of some projectiles Substitute part; spare part Concussion: shock Solidification; congelation Asphiniating gas; lung irritant(CWS) Warming: benting Softening to reply; terura

Earthquake bomb

Land mine

Petroleum'

Hesting

Ground target

investigation; research

Result; yield; score

Completion; supplement;

replacement(a); reserve(a)

Quadrant clevecton(Gunv)

Retalistica fire; counterfire Ore; metal especially bronze Producer; generator; manufacturer Nickname for 1900 kg, AP bombi called in Ger "1000 ke SD" Ash: ash tree Forge; bearth; chimney; stack Vinegar Ethyl acetate Account Acethe sold

Drill(practice)bomb: dummy homb Drill(dummy)projectile. Training bike Drill(dummy)ammunition Drill(dummy)cartridge Expanding bullet; boiluy point hallas explosive: emplodable to explode Explodability Explosion pressure

Explosibility HE projectile Explosive force or power Explosion waver shork wave

Fahrgestell(Fa: Fast) Fallblockverschluss Fallprobe Fallschirm(FS) Fallschimbombe(FB) Estlachimaewahr FGew Fallschirmlägergewahr-42

(KFG-42) Fallschirmleuchtkugel; Fallschizmleuchtbombe Fallschirmleuchtparrons Fallschimpstrope für Windmessung . Fallschirmrakete

Fallschirmranchpatrons Fallschiemenuchzeichen Failwinket Fällung. Fallzlader

Fangnets fanges Farbe 1

Fasching(Fasch) Facer . Fassnebel zeratäuber

Fanat Pauntfeuerwaffe Faustpatrone F-Boot Feder Federantrich Federkapsel Federken! Febler feinl braiges Pulver Feld

· Peldbehn(Feba) Fuldgeschitz(FGesch) Felder Felder and Zlice Feldhaubitze(FN) · Feldkanone(FK)

Extidate: exudation

Factory; works ! Branch; department; trade; branch of knowledge Flare; torch Thread; friament; string String propellant passable; transportable; portabl. Driver (of a car) . Chassik Bicycle Vehicle: crafe Drop hammer Height of drop Precipitating reach Drop test; impact test Parachute Perachute bomb Parachutint's automatic rifle

Paratroop fully automatic rifle Perachuse flam Parachute-fiare carridge for signal pietol Careridge with parachute for measuring wind velocity Parachute rocket signal Smoke signal cartridge with parachute Parachute smoke signal Apple of fall Precipitation Percussion fure (lit drop fuze) Antisubmarine net Color, dye; pigment, Fascine (bundle of sticks forthe strengthening of field fartifications) Fiber: filament Smoke sprayer (barrel) Fist; grasp Hand gun First Cartridge; HoC moket (See description) Tank landing craft Feather: pen: aprine Spring action (clockwork fune) Cap over a spring Elasticity Error: defect: mias Fine-grained propellant Field; land(rifling); around Field railroad(narrow-sass) Field piece; field gun Lands(Onl) Lands and grooves(Ord) Rield howitzer Field cannon .

Funkturm(FuTu)

Feldpatrone(FPazz) Field gun cartridge(Fix Ameso) Field police Feldpolizei(Fapo) Army medic Felderher Feldwebal(Fldw) Staff sergeant (except in Arry & Cav Feldzeuglages Ordnance depot SP mount/See under Panzer Feedinand far, distant ferra Ferngeschous(FGesch) Long-range projectile Fernanschatz Fernkamof Longvange gue enschut #FEG) Famgesteverres Geschoss Guided missife Long-range propellent charge Fernindung . Feenmhe Tulescope Fernschap(Fosb) Television Fernsprechen Fru) Telephone Remote control guidance for Fernateuer Geral winged missiles, such as V-1 Remote control; guidance Fernitanerung Fertigung ! Making ready; manufacture Year of maguineture Fertigungsjahr Pertinguades Rendy-fixed faxe. Ferselballon(FeesB) Captive balloon; seusage bal test etagebaures Fixed machine gun . Muschinendewska Festiakeit. Strength; resistance; solidity

Fentlegeprekt Reference point to acception; apportains the fe execution Foremg(Feet) Forteens; fort Fueronepartilleris Forcesa artillers Fourmaniioh(FF) Zorczena AA ano Portreta gua Featungugenchic Резгладоргафор Fontungakrieg Slege werfare facty; olly maint: heads Humidifier Principles Penchelhkeinegebalt Malapare cause Fanchemick Fire sone; range famorba acidati Finch bider flast

Fenerdinater dinofer Mind -fonerfont; fonordichas fonerpotilizisch Tonernenichs inflammable: linkle to enach for orrat wicht Veight of gun in action Formitte Height of manule Faueriger Schwades Firedome(coal mine) / Fourthruft Firepower Protechaics : timworks Feuerkunst; Feuerweck; Feuerwerkerei 7 Pyrotechaii pysocechay. Fauerlaitagent Fire coarrol instrument Fewerleitung Fire coetrol . Fewerlöucher Fire extinguisher Esperioschmitte Fire extinguishing aubetance Function Firearm; Tire tabe: fine

Lightship

le vernicher See leverteer Feweruttoes Burst Feneratrable Flag Jet of liquid fire Feververteilung Frent Fire distribution(Arry) Fenervatie Fireson; gue Faverneh Fire department Fewerverk: Fewer See Franchises Ferrenchal Ordnanci noncor officer pyrocechaier

**Fewerschlif** 

Fengrwerkskörper Filterbuchse Filz Filzpropten Fin Flurabwehr Flachbaha Fläche Flachfeue Flachfeuerseachina Fischkopigeschoes flacker Fladdermine Plagarchitt. Flak(Flugabwehrkssone) Flalintschinengewehr Flakpenner Flakvierling ' Flammendampter Flammonstruhl.

Flammonwer(er(FuV)-Flammen werferstennertrage Flanech Ffun schprechose Flaschessississ(FlEski) Flare(Financewerferteek) Flatternies Fla-Walfe Flieges

Fli egerleitpanner Flingerleuchtpistole Flighbacks Fliebbackenfeder

Fliegerdreh stekne (FIDSe)

Fliegerebwehr

Fliegerbombe

Plickhoines fliehkraft Fliesadeckel(Dichtungs

deckel)

Fliage Flotte Flug Flugabuehr(Fla) Fluesburbekanone(Flak) Flugbahn Flugblas : Flugel(F1) Fluge Idaer(FIDE) Flügelgrannik Flügelmine

Pyrotechnic componis Gas mask Felt Felt wad Antiqueren Flat trajectory Sortage flamens Flat trajectory fir-Flat trajectory gup Flar-coard buller to flare; flicker Contact land mine Flagship AA cannon AA machine ann

Special amoved vehicle with full armor cover; used as 4.4. weapon(See also bader Peazer) Four-barreled AA gud See Fenerdämpfer See Fenerstrahl Flame-thrower(See also Nahwetter and Veitwerfor) Flame-throwing tank

Flange Flunge projectile(See descripcion) Bottle-shapkd mine placed ander ice Flame-thrower tank Tumbling mise AA weapon Pilot is Air Corps pe

AA delense Airplane bomb Menico unknows to Acmored observation car used with front line support 'aircraft/See also under Passer) Aircraft signal piges) Centrifugal arming divice(Fa) Spring of contribugal arming device (Fr)

Contribugal safety pin(Fn)c disappearing diring pin
Centrifugal force
A cardboard disk impregnated with oxokerite, placed berween propellant and shell to prevent the escape of gases (obturation) and so lubricate the gua barrel. The device was used during WW I by the Austriana.

· Shorgun , Fleet; Navy; dye liquor Flight; flying AA defense AA gun Trajectori Propaganda lenflet Scabilizing wase or fin; wing let motor mounted on a wine Fin-scabilized shell Fin-stabilized mortas

flügelutabilisierten Geschons Fluxpeit Fluggeitmesser Flugzoug(Flzg); Luftfahrzeug . Flugzeugabwahrkanone Fluggengenchürz: Flugzougkangag Flore

flüssige Luft Flünninkeitabremas Flussigkertstremse Flüssiekeituzünder Flünnigluft Sprengeroff Flunckahel Flusacreibnine(FITrMi) Fabo Geres

Formänderung Formbakkeit Fortbewegung Fortpflanzungageschwindigkerit Stacht Friber Freischarler: Partisans Prettage Frietpunkt Friktionsmeaser Friktionexlindechraphe

Frittens Friez

Frühausspringer Frühaundung **B-Stoff** Fagange Führungsbendt Führungsring Fabrungswhist F Glock Fillmaperial: Fillmirrel. Filloffnung

Fullatoff Fülltrichter Füllung Fundamentplattic Funk(Fu): Funkagent Funke; Funken Funktuchronograp Funksuzindung

Fullpulves(Fp)

Füllgrelle

Funker

Funkmesegernt(FuMG) Funkpanner

Funksyndens Funkstelle(FuSt) Funktrupp(FnTr)

Funklitakpasser

Time of flight Chrosograph(Le Boulengé, etc) Airplane; aircraft See Flugabwehrkanone(Flak) Aircraft (AC)gun

Fig-stabilized projectile

River Liquid air Hydraulic brake Hydraulic recoil brake Liquid escape fuze; hydraulic fuze Liquid air explosive Marine cable; underwaver cable Drifting mine

73 mm Rocket Launcher(See under Weapons) Deformation Plasticity -Propulsion: movement Velocity of propagation; - of

transmission; or - of detonation Freight . Milling: cutter: reamer See Guerillakampfes Hooping; shrinkage Freezing point Apparatus for measuring friction Friction igniter; friction princips

Fritting: sintering Nickname for 1400 kg AP Bomb, called in Ger "1400 kg SD" (TM9-1985-2, p 25) Premature burat(Arty) Premature ignition: pre-ignition(MG)

Titanium tetrachlorideramoke seent) (CUS) Founass(See general section) Rotating bend: driffing band Bourrelei(See also Zentrieswaint) Filling hole(Ref 6, p 57) Filling material; loading material Chatging bole (Arty) HE filler(lit Filling powder) installation for filling projectiles

Filling funnel Filling: filler Base plate; foundation-plate Radio Spark; sparkle Sourk chronograph High-tension priming; spark prise Gebirgsgeschutz(GebG) Radio operator

Radio controlled light tank for apecial purposes (See also under Pagget) Radar Armored vehicle for troto conmunication(See also under Panzer)

Radio transminsion Radio station

Signal curps detachment

See Fillmarerial

Radio tower Funktionsprobe Functioning tes Funkwelle Radio wavels Futier . Quarrermaster sergean Frindier Riflemati; infantry private Fusamorae Place base mores Funsplace Foor place; float(AA G) Futter Forage; fodder: lining Futteral Case: scabbard: sheath Furteriauf Liner(of a gun). Fattecroke Lining tubes inner Liner(G) Furneestuck Bushing(breschblock)

Brecket: fork

Bippd

'Veapons)

Motion: action:

Gun carriage with shafts

420 am Howitzer(See under

Mountain piece; pack gun

Jelly, seletin; glue

Gabel Gabel Inferte Gabelatiltan Galleri Gamman(Mörner) Gang ! s Gangepill Garbe

passage(Mining) Capaten Code of dispersion(Guny) - Garebwehr Gas detence Gasbonhe Gas bomb Gashrisansreachoas: High explosive chemical Gasbrisanagranare shelf Gandroék Gas-pressure; blowback Gasdrackbomb Pressure homb Gandruckgerät: Gandruci Pressure gage; crusher anne measur (See also Menati) Gasdruckbüise(GDrH) High-pressure carridge Gandrucklader: Gaskol-Blowback-operated(automatic) healades weapon; gan operated gun ... Chemical land mine Gas-Erdmina Gasseschous Chemical projectile; gas shell

Gaugewehrgranate Chemical rifle arenade Gangrapate(Ggs) Chemical shell . . Gashandwerfer Chemical hand arenade Gaukampi; Gaskries Chemical waring Gangorner Chemical mortal Gassaunition Chemical munitions Gastref Gan-tar Ganwerfer Chemical(gas)projector gebalite Ladung(GebLdg) Concentrated charge(consisting of several explosive blocks tied together) gebalite Ladung 3 kg Demolition block containing 3 kg TNT gebalite. Ladung 10 kg Demolition black containing 10 kg HE Gebifrantillerie(GebA) Mountain artillery

Gebicgsgranate Shell for mountain guns Gebiresbaubitse(GebH) Mountain bowitzet Gebitgainfanteriegeschütz Mountain infantry howitzer Gebirgeinget Mountain infantryman(See also fäger) Gebireniager-Batailling Mountain infantry battalion

(shock troops) Gebrauch \* . User runtom Gebruuchsladubs Normal charge; service charge(Ammo)

Vessel; receptacle Fight; fighting; bertle (See Gefech Kampl and Krien) Gefecheiken Warbond(Td) Privme ficht class Gefreirig Getriogen Freezing point. Seructure: renture Gefiae Contract Concepts Ge halt Hardeped steel Case; ensing; housing Secret Same Police (Gemess)

askrimme Flugh Curved trajectory asiadon(ani) deaded; signed; cheege Gelpringdyse d Yellon cons (Ger marking for venicents) (CVS) Chemical peoperate

Galland Jaint, knychle: Minible coupli Gelenkhile Neuticid gun carrings galiefen(gel) Geweinde Poline actually popyided Local polick! towaship po Genenge; Gönder Rival policamen named Stady of the A-· (Goadebil)

Baggage; Inggage<sub>te</sub> periodale; perilic actiliare Granhaus Canadased balls مجنبده ولعوجه Over-ull leages Genelated Gene Genelated in Genelated in Projection missile Trojectory; ballistic e Base of projectile Spin of projectile Diameter of projectile Projectile focusey; shall focus

Grachoundrall:Gra Gaschaufsbrih(Gf)
Geschauffbruns Section forcing to | sectorally Geschoosfewicht(Gg) Veight of projectile. Ge de hoosgeneh windig Velocity of posjectile Combandibles Shell corny Goocheaphille Body of penjectile: shell Geschoushille Cartridge cape Cap of posjectile Geschounken Core of bullet Head(point)of jo Grachaeskood Jacket of bullet Gerebosominal Chill Ingestined A/T.nice in a HE shell Geochoso-opitm; B Ogive(Proi) Ge achese es Duroting charge of peripetile Projectile components; bullet Geschassaspion

prochrumphen Robe

Rear part of a shell

Built-up bareal (Lie Street berryl)

Genellita Genchütz auf Selberfehrlaffete Genching admin Genehut mulver Gue propellant Gonchinzvitzchlung breechblock Geschwindigkeit Velocity: speed Genellache/t Society; company Gentalt See under German Gentapo Abbenninsings Gentein Rock: stoog Genteinungenun Gesteinuprengunt

genequèmes Goachnas gesteueren Naschiere generackee Flughebe nemerkee Ladeac

granate(GraPsar)

Gewelegelden

Ge trakesprong-

Gowinsky

as well be

genogen(hen)

geingener Tell de

genegrees Ziel

giqssen Giftsabel; Gifus

gemeenere Geneble:

granace(GraSprgr)

newerbliche Sprengere

Gewelepatron(GewP) Gewelepatron(GewP) Gewelepatron(GewP)

generachten Kineu Vrought iron (See sice accacpast) Cerval meal: mein flou See Vochseleeniebe Power; force; violence "pewelmer Stabl Relied steel Fabric; tisvoi . Gewebe Gameba(Gow) a See Gamele Grunbeggerbage(GauG) Rifle ballet Gewehrgrenque(GewGe) Rifle greende Gewebekarranche Propelling contrid ide greasds Gewitenmicies
Gewelennicies Rifle agmunicie

Syschoonized MG

Fim wajectery.

Bangalore tempody (Secular Raintedung)

Rifle peopellan Rifle shet Rifferen HE rifle ground Industrial compercial) explosives Veight: gravity Value of live projectile Throad (of a serow); win scienyex; method; visited , ziffed(barrel); drawn; jon Rifled part of barrell Rifled and Towed target

Sanke greands for a

Rifle enterider

Binet furance dust: to vaw (See also Saicwaresbewingung) to pour cant mold Toxic smoke: itritant nacke(CVS)

Artillery piece; gen; Self-propeiled gin

Gipfelpusks Gue propolling charge Glammine Gilimpo(den Pulvera) Gum harrel/See also Robe glames Geochicu(glG) glambo(pkliemes)Pulver Breech machanism: alance Robe gincewandig Gleichgewich Form: shape: figure Gleia Gleichembe Glimmanu (Gl'an Rock-blanting explanive blasting emplosive glibes controlled; such Glibdrabt: Glibfad synchronized

G! likkindchen Gliblame. Glibalishppares (See also Zindenschine) Gilhalindon(Gluks)

Glüksündheue Gleballadaeukk

Golioth Schlig 302 (Golioth Secondianes Krahma 302)

Grahau Grabengeschäfts Gribeshaubkae Genbeukring Genbeumine: Genbe reamer, .

Grad Grandbilebas (GrB) Gramate Gratale Berou(Gelle) Greanfüllung (Grf) Gronnefillians 42 (Grf 02) Granacfüllung 88 (Gel 88) Granschiller Groundkartifeische Greentlock Granaraignal

Granetuplitter General werfer (G(V)(54 Moreer)

Gemmerter File! ling(Gr# 5ling) Granstwerfergenchens

(Gr#G)

Summir(Traj) Grating; screen; grid; lattice Glans had mine Glazing(of powders or propellants) Smooth-bore gua Glazed(polished)nowder or propellant Smooth-barrel Sangoth-hora Balsace; equilibe Rail: mack(RR) Glide hous Mica

Tricer with glowing compositi dim cencer, se slow Eilament Vacuum tube(Rad) Hor-wire headen-head (an an electric (aniting device) Incandencent laste Low cention blasting mechine exploder(Engl); electrical ignition **ADD MANAGOR** 

Low reasion electric ignitur or electric detoustor chain with delaye Low renaion plectric ignitur or

"Golinth" Demolition Vehicle 902

Gondoln; bacelle Soft-naphale or mixture of hard largein, geiliod-dgid fith sladgen Trench: ditch Trench piece(Arry) areach and Trench howitzes Treach burface Trench morear shell

Teènch morese Degive; grade; ranks Greande launchina rifle Shell; projectile; presade a Anticoncrete abell Shell filler Shell filler type 1902(TNT) Shell filler evpe 1800(Picric acid) Shell case . Can inter shell Shell hale ' Projector nignal; rocket nignal;

near shall Shell aplineer Shell creter Shell creter Grennde thrower or projector; treach mortar; h/T grennde rifle

porter (launcher)

Gradiscasinder(GcZ) Granulierung graphische Schupe graßbirieres

Edge; ridge, burr: reom: (in bore of a gua) Grauguna(Ge) Cast tron; gray tron casting Grauspiepuglage Antimony trisulfide(Shy5,) envinetrischen Gewiche Gravimetric density Greendier Infantry rifleman; private(Sealso Panzergrenadier)

Fuze for HE shell

with US graphical firing table)

to graphite; cont with graphice

Frontier; border; boundary

Propellant in Juran flake

Heavy flame thrower(on

Admiral of the Fleet.

Quantity; magnitude; sine

Large iguiter or primer ch

Mine! quarry; bole; pie: ditch

Firedamp(explanite mixture of methane had nit); mine domp Bana piece; directing gue

Been charge; main charge(fier also Sciemeliciadusg)

Goods trees (Ger marking for

Group fire; volley fire Double-base propellant coars

Guerilia (See also Parciame)

Bele; strap; girdle; tamanicie

Belt; strap; band; girdle;

Cast steel; furance segel

Freight sention(RR)

Freight cor(RR)

Preight train(RR)

800 mm Gua(Sevasropal)(See under Weapons)

to load an ammunition belt

Grop: bandle

Gross weight

wheel carrier)

Large charge

Make production

Muxtie velocity

Fixed ground mine;

controlled mine(Nav)

line inhibitekCVS)

nitroguaniding(NGu)

Finid kitches (uloss)

bole; feed belt "

Rubbers gum

Canting

Cast iron

large caliber; his hore

Granulacion

Grean(Gr) Griff arobes Blättchen pulver(grBIP) Grobkewicht Grokemaner F1 werfer) Geossadmiral Grässe" .

grosse Ladung(grldgi grosse ZündladungerZdie) Grossfertigung grounkslibeig grosate Vo Grube

Grundgesthütz Grandledung Grandlai

Grundmind Gelinkerun Gelen)

Grace enfence

Gudelpulves/GuP Gutrillakümefer Freincharter Gylanchkane

Guet Gineral .

Guancines Gunn-wahl Guseny Genchies: Does

Gilterranges

hancorio

Hairlike: capillar Port; harbor

|                   | Ger                                                            | 19                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>19</b> € 2                      |
|-------------------|----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
|                   | Constitution and the land of the land                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |
| inag(Holeiti)     | Custody; nerest; bole; loop; confinemen                        | Haupckartuscha(Hatkart)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | binin propelling charge            |
| (manua)           | Magnetic antitank hollow charge(HoC                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | in non-fixed some<br>nilknetunche) |
| long 500g         | (lit Adhering hollow charge)                                   | (See also Korresche and T                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                    |
| inna 3ka          | Magnetic HoC of 500g RDX                                       | Haupting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Main charge of propellant;         |
| amil Self         | Magnetic HoC of 3kg RDX                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | hase charge of bibating            |
|                   | Hammer; cock; suspenselt                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | cap or detonator                   |
|                   | (lic receter)                                                  | Hauptmoun(Hpt)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Capenin'                           |
| . 4               | Hammer shorges                                                 | Haupewache                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Main guard                         |
| and of            | Hander sifle                                                   | Hospeziadung                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Main ignition                      |
| 4                 | hommerleau                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | land-in(D1)                        |
| Germake           | Hanneriess rifle                                               | houtheapad' .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | wanicasy(CVS)                      |
| •                 | Hook; clasp; clamp; smeck                                      | Hougist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Bliseer agent;                     |
| 4                 | Acquebus                                                       | describer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                    |
| ?                 | Semi-alesantic weapon.                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | venicent(CVS)                      |
| 4444              |                                                                | Hebal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Lever                              |
|                   | Redius; semidinuseer                                           | Hebelander                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Lever type igniser                 |
| proceso(Halloway) | Hemisphere                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (for Gines mine)                   |
| hammed sample (   | SAP projectile                                                 | Heer(H)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Army (che Army, as                 |
|                   | Nock; throat; stem(of a thermompore)                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | distinguished from Asmes.          |
|                   | gable; dumblerbating<br>Sability (See also Lagerbanes digitals | the state of the s | n tactical unit)                   |
| Bereindigheie     | Sighility (See also I pagebogened shale)                       | Hearn seasons                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Semy encablishment                 |
| (a)               | Retaining ring                                                 | Heesesactiliesie                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Acay artitlery                     |
| be .              | Recaining screw(Fu)                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |
|                   | Retaining pin                                                  | Heese statuseug(Mf)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Amy vehicle                        |
|                   | Seep migarel                                                   | Horralink(HFlin)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | - Army AA Arry                     |
|                   | malicable                                                      | Hoerentunkoselte (HFu)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Army radio station                 |
|                   |                                                                | Heere champequarties '                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Army general                       |
|                   | Vrought iron                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | handquareers(GHQ)                  |
|                   | Hand benks; omergency broke                                    | House alaparete                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Amy general hospital,              |
| Hen .             | Small amag shoulder appellit                                   | Hoorg amusicione                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Army namesities deput              |
|                   | Hand Streams) 1                                                | Ingre(HML)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                    |
| (Har):            | Handgernnée(HéGe)                                              | Henres walfenand HWA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Army Ordnesce Office               |
| endado '          | Headle; prip                                                   | MANAGEMENT AND                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                    |
| •                 | Handling; menipulation                                         | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | (See under Varplante, que)         |
| ent chaire        | Emploaives note to headle                                      | jerretarryent :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Army ordenace expely               |
| , , ,             |                                                                | 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | dabbet drautermenne                |
| delian'           | Head signal (lare(ground)                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | depart                             |
| feben             |                                                                | . Neiskeeft                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Hencing person                     |
|                   | Hand sauks signal(pround)                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | calorific power                    |
|                   | hand operated; meant                                           | Melmino /                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Not place 's                       |
| 100               | Head wropen; band man 👢 .                                      | Heirung (                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Heating; firing                    |
| ler alies 🛴 💮     | Moreous tremely moreous                                        | Helin                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Helmet                             |
| )" ("             | (lie Head projector)                                           | Head                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Shirts shell of a                  |
| 4                 | Hand tools                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |
|                   | Slope; heat                                                    | 4.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | blast hare                         |
|                   | Housing mine                                                   | manage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Jaming; nelppage                   |
|                   | Ures                                                           | Notice .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Nickiame for 1000 kg               |
|                   | Harmstel (qupos(of g moral)                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | GP-HE homb, called in              |
|                   |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Ger "1000 kg 5C"                   |
|                   | Herd core (outh as of tenaster cabile                          | Hereseller                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Manufacturer : fabricate           |
|                   |                                                                | Hersellman                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Production; magnifecture           |
| 7 7 1             | Resint votin                                                   | Heren                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Baiser, York decemper-             |
| . 1               | Sallietic cup(DC)es some larger                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | of Stodewerke (See make            |
|                   | calibes shells; false cap;                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |
|                   | windshipld                                                     | Hilfolofono                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Peaner)                            |
| nOthers .         | Shell with BC (ballistic cup)                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Imperizing mount                   |
| resident (Sec 2)  | PD funt for use under BC                                       | Hilforniel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Auxiliary table (Bull)             |
| enti(Hallete)     | Shinood with false can                                         | Hilfowatto                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Autiliary com                      |
| Sor also Mirear)  |                                                                | Historiades                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Breech loader                      |
| (100 (100)        | *Howitzer (light and medium)                                   | 'Hitse ,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Here; between pession              |
|                   | (See also Socilfonergeachtes)                                  | H-Ludweg Hebb                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Hellew charge(HeC);                |
| ww(HT)            | Twent howissor .                                               | Indung(HILML)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | spuboq cynthi                      |
| n(HGrpMgr)        | Hewitzer shell                                                 | bachbrissant Sermaniff:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | High explosive(HE)                 |
| lve(HR#)          | Propellant in rings for field " '                              | Brisenzaprengmoft.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                    |
| ,                 | howither                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | (lie Highly beisone                |
| ×(H2)             | Howitzer shell foor                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | explosive)                         |
|                   | Main monomission; main goor                                    | bechannlindlich                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Papersonnicive                     |
|                   |                                                                | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                    |
|                   |                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |
| •                 |                                                                | · *                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                    |

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Supernensitive percussion fuse Shell for infantry gue lafanterigransce(lgr; Jge) Influenadetonation Sympathetic detonation Höchnegnadeuck Maximum gas pressure 🔍 Ingenieur; Ingenior Engineer Höckstachiteane Maximum range Inhaltverzeichnie Table of concess Höcker Hump; bump Inhaltszettel Concent label Hőckarhindemisse Dragon Testh (A/T obstacle) instralexplosivatoff; lasting explosive (such as hohi hollow; concave Initialsprengscoff MF, LA, LSt, etc) Cave; cavere; bols; cavity laitealimoula . See Zündreiz Hobigenchuns; Hobikopi . laiciatladung Hollow head projecule initiating explosive charge perchées Hoblindung(HI; HL) laitial zünder lanenzünder Initiator "Hellow charge(HoC); Internal fuze shaped charge P lanere Ballintik Interior Balliatics Notes Ducing WIII the German used at least four types of hollow im Rohr gefullte Bangalore torpedo charges: HI, HI/A, HI/B and HI/C Hohlindung 300g. Reibenladung 300g Hollow demolition charge latere soengen Association for Further Hohiladung 400g 400g Hollow demolition charge schaft(IG) of Mutual Interest; Trust Hohlindung 12.5 kg 12.5 kg Hollow demolition charge Cold resisting grease Hohlladung 13:5 kg Hohlladung 50 kg 13.5 kg Hollow demolition charge irdes ware Earthenware 50 kg Hollow demolition-charge Error; misrake Hohleisgladung Hohleisgladung 1,2 kg Hollow, ring demantion charge Isolator **Jasulator** 1.2 kg Hollaw, ring charge '3.2 kg hollaw, ring charge Hohlringladeng 3,2 kg hall indisch(h) Dico Holzgeint; Holzsprice Wood alcohol; methanal Jabo(Jagel Jagel Fighter bomb Holakneun Wooden box 's Hunc: chase Helakohla Charcoal Tank destroyer Japan معونها Holametal Wood meal; wood flow (See under Panner, in Hotzmier Vooden box mine descripcion part) Wood pitch Jagdpanner(JpdPn);~ Tank destroyer or b Punnerjüger(PxJag) (See under Paguer). Holzereinkohl Jagdpulver Jagdriger Tiger Jüger ووامهشا Hunting (sporting) propella-Holseroff Wood pulp; Tank destroyer (See unde Holanesis Peaner in descriptive part Hel meer Your tar Your fat pitch Hunter; chaseeur; ranger; Jüges(j) Hel meernec rifleman in Jagerdivision Helazellateff Ligaocellulose private in Gebirgejäger Sound locator or detector Butaillos; fightur airplas Hornott Self-propelled A/T gu pursuit plane Light infuntry bettalion (Sen under Pauxer) Helicopeus ranger beeralions (See als Cover; covering; case; sheat Gebirgsjäger-Becaillen) Marie and Hall; husk; carridge case Keerdivinion Light infantry divinion Sammerachiant (G) Carridge case entractor Light infantry piece Carridge case identification (G or How) (number) ] ingergrammen() Ge) Base of cartridge cate loding Neck of cantridge case odanid lodine azide Carridge case of espid-fire non-line Jodeanige Ethyliodonterner(CWS) mmunicion (as opposed to bac) Tincome of loding Cárridge case odzahi lodine number Cartridge case sim to adjust; collimat Bumblebee SP Howitzer/See w (born-night alignment) Pager in descriptive part) 'Mat; cap; cover; lid; top Blacking cap: cup (cartridge) Hut; corrage; fron works; rolling mill; Kabel Cable; wire, glass works llydrocynnic ucid (See also Kafire) Kaba Beer THERETIC CHE Kai Kajuta; Koje Quay Cabin (skip) Kaliber(Kal) Caliber; gauge Kalilange Countie potnoh(KOH) reia(I; J) 🐣 Kalium(K), Kali Potassium(X) Infantry piece(G or How):

| ' Ger 4                                      |                             |                                                |
|----------------------------------------------|-----------------------------|------------------------------------------------|
|                                              | and the                     | 12.6                                           |
| Line solution; milk of line                  | Kavaleriegeschuen           | Cavalry gue                                    |
| Calcium nitrate                              | Kegel                       | Cone<br>Identification mark                    |
| Cold adhenive putty need for                 | Kennbuchuraha               | Mark; stgn; sidication                         |
| mesching demolition charges                  | Kesazeichen                 | Code; designation                              |
| Cold extracion (lit Cold-squirting)          | Kenezeichoung               |                                                |
| Autofrettage (a process used in * .          | Kern                        | Core; aucleus<br>Buller with core              |
| meant of gun borreln)(See in tile            | Kundeschoen .               | Base section(SLAmps)                           |
| general arction)                             | Kernindung<br>Kernenutakan  | Caudie power                                   |
| Crose; ridge; comb; cum                      | Kertenkunel                 | Chain show                                     |
| Chambers room                                | Kienel                      | Flint; nilica; nilen, pravel                   |
| Condral tube; Elnich tube(She)               | Kiff                        | Tan: tanbark                                   |
| Flash tuba zbargu(Shr)                       | Kipp number(KiZ)            | Tile type ignises                              |
| Bucaret tube .                               | Kissen                      | Cashion; pad; pillow                           |
| Bantle; combat; fight (See also              | Kipte                       | Cane; chess, crate; bor                        |
| Gefecht and Krieg) Was gong pointen gan(CWS) | Kitt                        | Coment; purty                                  |
| Rifled bere nigent pistol; Yesy              | Klamace                     | Clause class; put                              |
| pistol (See also Leuchepistole)              |                             | swiveRAf); clip; passabools                    |
| Chamberl bomb                                | Kinppe                      | Flop; trop; lid; damper                        |
| Contact vehicle; task; nemoted vehicl        | Klaifkleiser Flannes-       | Pottable flome through                         |
| Took tree                                    | war(er)                     |                                                |
| Took see                                     | kleise Ladung               | Reduced charge                                 |
| Connen; gun; place of urdanace               | Kleinkalibarlunf            | Small born barrel(RI);                         |
| Guebeat .                                    |                             | subcaliber tube(G)                             |
| Canana shall                                 | Kleiskaliberspunition       | Subceliber annualtion                          |
| Gen bereel                                   | Kleinintechiff .            | Blimp                                          |
| Sanke-pull charge                            | Kleinter                    | Adbenive passe; thin passe                     |
| (pinninted fire)                             | Klemms                      | Clie; class; terminal(Elec);                   |
| Gun aluer                                    |                             | binding post                                   |
| Fune for a cannon shell                      | Liophiese                   | neciknock                                      |
| Private(Arty); connector                     | Knell *                     | Rang: crack; detennation; report               |
| Lieurenen-Commoder(Hav)                      | Kaallekapter                | Silencer(Rf or Pinc); muffler                  |
| Captain(Nev) pres                            | Kanilgen                    | Daykyárogen gan                                |
| AP cap (See also Haufe)                      | Kaallalyzerin               | Fulminating glyceria;                          |
| Capped projectile                            | Mar. 11                     | nimoglyceria(NG)  Mercuric fulminato(M F )  Vi |
|                                              | Khallquecksilber            | Fulminie acid                                  |
| donostur                                     | Knallailber                 | Silver fulnisme(AgF)                           |
| Carbine                                      | Knallwelle                  | Shock wave                                     |
| Heavy SP, Moranta (See Ther and              | Knailseches o               | Nicroglucure; nitrouncebuses                   |
| Karl Mortors)<br>Canimer(SL Ammo); case shot | Manifestation Personne      | Primacord; decounting fuse                     |
| Schraiger(Shr)                               | ende Zindechuse             |                                                |
| ocuration('ant)                              | Knomaschine                 | Kneeding mechine; melanose                     |
| Presellent has                               | Knick                       | Breuk (in curves); sharp bend                  |
| Cover for Karranche                          | Knicksmodes(KnZ)            | Sone type igniere                              |
| Cassonche; container of peopalises           | Excel                       | Butten                                         |
| charge not used in fixed name                | Kechaniu                    | Kitchen salt: common sult                      |
| Bag container of propelless charge           | Kohle                       | Coal; carbon                                   |
| piaced in Karuschenhules                     | Kojes                       | See Knjike                                     |
| · Cartridge tase for Kartnoches(4 v )        | Kohlengrebe                 | Coal mine                                      |
| Ammunition using Entrochen                   | Kohjes seers                | Carbonic ácid: carbon diexión                  |
| (Compare with Patronenmunition)              | Koka                        | Coke(coal)                                     |
| Muzzle-Stank reducing weed                   | Kolbon                      | Finak; burt(Rf., Pioc. MG, etc.);              |
| Capemace                                     | _ 4 2 2 2                   | piaton                                         |
| Casemine cannon,                             | Kolbenpiscolu               | Machine pintol                                 |
| Casemate gua mount ,                         | Kellddinmoolle              | Colodina comes; soluble MC                     |
| Permanint barracks                           | Königstiger                 | King Tiger(Tank)(See under                     |
| Officer's mess or club                       |                             | Paster)                                        |
| Targes indicating flare                      | konischen Robe:             | Esperad-bare barrel(G);                        |
| (TM-9-1985-2, pp 71-2)                       | Wirgebohrung                | Spacene born berret                            |
| Chest; lox; case                             | Kontaktonomine<br>Kopf(Kpf) | Contact are mise Head; nose(B); point(Sk)      |
| Box, trail gun carriage                      | Kopfring                    |                                                |
| Catapalt                                     | Kopfwelle(an der Spitze     | Front Ying(Proj)                               |
| Geourchour; rubber, before                   | Poblacitat mit gel abitte.  | Shock wave on the tip of                       |

Ger 281 15, 1

K allimitek

Kaleupeicson

Kaiksaipeeur Kaitklebakits(Kat)

Kaltyecken; Kulmechung; Selberschrungfung

ne(Xb)

Kampigan; Kampig Kampipinalo(KP)

Kampi Lampiwagon(Epiw; Kw) Kampiwagoninilo(KwF)

Kanope(K)

Knadorogramme(KGr)

Raucherschusseng

Kapitalewan

Kappo(Kp)

Lappengene

Karl Guill

Karificache

Lacitachen

Scheppell

Kapitan sur Soc

Karabinar(Kb: Kar

Karruschinckelt Kond

Enrugchenhülze(Kaish)

Kestuschenmunition (Karthin)

Kask(such ah bik 50 Kask)

Karrasche(Kare)

Kanusche, einlach

Earteachenverlage

Kaneran

Xames

Katapult; Sel

Laurachuk

Adress 124

Kampinagenionone(KwK;Kpiw

Kopinindes(KZ:Kuin) Point-desquating fune(Pro)) Kühler mone fuze(B) Kilkimente Water jacket(MG) Keeb. Banker; crate; cluster of bombs Kuliane Coulisee (slang) Kupferdrah Copper wire Kordit Cordite Kupferkapsel Copper case(blasting Grain; com; front night(Wp) Korn cap; etc) Kimches Granule . Kupferpanzeratahi Bimetallic rotating . . band'steel covered with Keensul Granulated powder fibrungucing(KPS) Lieper Body copper) Ketron Lieutenant Kupferschiefer Copper-bearing schint or shale Kroch Crack: cresh Kupferzylinder(des Copper cylinder(for crusher Kond See Kenfernd Stauchapparates) Kuppellaffets test apparatus) Kraft(plKrkhe) Force(a); strength(s); power(s) Cupola gue mouse Kenfrinkenny(Kin) Kenfrauelie Motor vehicle Kupplung Coupling: connection: clurch Power source Kurbel Crank Linkson Motorcycle Kurt Apparet or Spherical, hydrostatically Kraftmoff Fuel. 5B 400 Kugel K operated aircraft-laid skip Kraftibat bomb (TM 9-1963-2, pp 14-15) Power transmission Kraf twagen Motor car; nucomobil Kurre Curves tues Kraftwerk; Kraf Power station Kurzechnen Short(Guay); short shor Kenfrang Power traction (se a prime Kurzweile Küprresertilierie(KarA) Short wave mover); truck with timiler Coast defense artillere (mit Kraftzug) (Tenctot drawn; truck drawn shore artillery Küncenbarrerie (KarBeer) Kraftzmaartillarie dotorized amiliary Coastal barrery Ctanes cocks fauces Küstengenchütz(KatG) Küstenhaubitze(Katk) Küstenkanone(Katk) Kroba; Kron Coast defease place. Kreekeekees Hospital Coast defease howitzes Soital Coast defense campon Lreis Küdlenlafette(Katl.) Circle: are: Coast defense zin m Kusrenmorase(Kottles) Kreinel **Gyroscope** Coast dirigans me Küştesmine(Kuthi) Kreinelpas Centrifugal no Constal mine -Küstenwache Twhise -Coast guard Gyro sight Kreinlauf: Krei Cycle . krenieren to bheati diet englode Laboran hropitie Laboratory spekalelog(male to crepitate; crackle Crepe Laboranti Laboratory techniciss(female) Knyp Inhorieres Keens Cross crosspiece to labor: to week in a tary; tp-place (of universal joint) Kreume Crainer Lack Lacquer; vamish Lackmen; Lacmes Ladedichte; Ladengalichte Limns Keeual oues Cross fire Loading density; density Kresmolver(KrP) Tubular propellant with s crossoluce inside of tube charge to load; charge Intersection Krowene War (See also Gefecht and Kair Breechblock Krieg A device for charging Krivgoo Var equipment; are Var materiel Kriegugerlit eluctric bomb funes(li Charming bread) Kriegumatine Krieguministe Nave(lit Was Marine) See Luduingeraus War Department . . Rammer; rum-rod

Kriepachiff

Krigappurft

Eriminal policy

buldaches Pales

Kunelform 3 kg

Kugel K

Kugellager

Kugelpatroke Kugelopritze Kugelspribnia

kugelfent; kugelnicher

Kugel

Warship .

Criminal investigation police

Bent barre l(Sen description) Keupp Movie, heavy can't

Cubic powder or propellunt

Buliet: nohere: shot: ball

(See under Panzer)

Jeep; bucket

builesproof

Ball charge, 3 kg

See Kurt Apparat

See Maschineageweb

Spherical floating mine; upon

chared automotic contact mind

Ball bearing

Ball carridge

Navy yard

Lademork Ladeutrelfer Assumition plint carridge nlip(for loading magazine rifle) Cattridge drum Ladevorrichtung Loading or feeding device; breech mechanism Ludung(Ldg;Ld) Load: charge: iacrem filling 7 Ladungabuchne; Ladunga-Blasting charge container:

Ladungstraum; Lade Palverraum Ladungoverhälmie

gefänn; Ludungsknore

Ladungagewicht

weight of projectile)

blasting charge box

Chamber; propellent chamber

(See also Verffrennungsraum)

Loading ratio (Ratio between

weight of charge and total

Weight of filling

Storing true (See also under Peases) Lindmile Lindmine Scorum miluf 1:609 km) Lind miss Tetritorial trained reserves Note: According to H. A. Tirch of Picutinay Aramai, the

imperial Gorman Army had approximately, the following classification: Active (ages 18-22), Reserve (22-28), Erancy Reserve (28-32), Landwelt I (32-35), Landwelt II (35-38). Londstons I (38-42) and Landstons II (over 42). All clauses were trained. If the men had not perved 2 years in the

sicining. Landoverke 66(1.-60)

Landaliane Schloppes(LWS)

Llage Lings der Valle numbalkarna 420th Fal. 42

Low

Laufanie Louge

Lautaparchae Laxarner: Kr Spiled I shouldness Co Lebhaftigkeis Vivacity Leave

Leasperich laiche(f; la; L) Leichtgeschütz (IGt foG) Leichemenali(Les: Lift) Lolell

Camp; depot; dump; bed; layer; Bentindigkeit, Haltbackeit and Stabilität)

Groupd Blace for aircraft landing Atmostd amphibious trees carrie

active alony, they had so so through 6 months of basic

One of the maked See und Pinast) Sarbe presenter for aircraft Inching Agricultural tractor of pee-WW E

which was conversed to (See under Penner) Longiti; longitude Leagth of weapon Elengated projectile Land masks presenter 42 Long you; long-bider led gas Siew-burning popullant

Long wores(Rad) Long time funet delay has Lond; burdon; weight Barrel(SA); course; jan

(See also Robe) Bore(G) Becolot a small am) Caliber(SA); (See also Kaliber) Rusting time(Fa) Lye; leach: (Sedium Potlanium Hydroxide)

Loui speaker Hespital Hospital wais Life (of a sun)

Vacuumt or Veight enner Light wenpon(such as tecoillean gm) Light metal(Alm

Leiter Leitfühinkeit: Leienger fehickeit Laitfauer

London London techili

Ger 283

Leigtung

Leitung

Leopard

Loopald

Letten

Leuchthomi

Leuchtfell schire

Leuchtgeschous:

Leuchtgrunnewerles Leuchtkugel

Leuchternauere

(L'sourGe)

Leucheman

(L'speches)

Leuchteren

Louchryiniae

Leutsenr

Liche

Leuchtweichen

Lichtspur(LSp)

Lenchreifferblan

Lichtmensung(Littorg)

Lichtspurhülse(LSpH) Lichtsende

Leuchtopurhalos

(L'spurit)

Leuchtspursuts

Laucht- a Signal-

Manition/LuSter)

Leuchtfallschirmgraust

Leuchtfell schimerabete

Leuchte

capacity; work Conductor: leader: suide Conductivity Ringing rounds (used to establish the accuracy of the entirered distance from liting ponition to target)

Output; performance;

Electric cable; conduit Ope of the tanks (Seu under Pagage): 200 nm Railway Gue Model 5. called alon Ausin Annie Potter's clay; clay used to

ramping Illuminating bomb; flure bead Light; lump; illumination Parachure flare Parachus flore shell Parachute flare rocket Star shell; illuminating shell

Leuchtgeschose-Zinder(LeZ) Fune for star shell Pyrotechnic morear (projector) Ground nigent; Véry nigeal light . Pyromekaic device

Leuchenissel
Leuchenssition (Little) Pyrotechnic annunities flace ammonistica Leuchtrotrone(LPast) Signal cartridge: flare

cartridge; (single star) Louchmissols(LPist) Smooth-hore pyrotechnic pistol: signal pintol (See also Kampfpincole ,Leuciurali esp Signal fockers flare rocket

Leuchtrobre Finorencent tube Louchtons Luminous composition; flare composition: pyrotechnic Traces trajectory; light trail

Leuchterus(L'mour): Lichtspur traces projectile Leuchtspingerschos Projectile with traces (L'spurG) Tracer shell Leuchtopararagan

Tracer element container

Tracer semunition

Tracer composition: eracer column , Stor(illuminating signal) Signal pierol ammunities Luminous sight

Ground signal light L suinous dial Second ligureous Light; candle Flagh reaging Sae Leuchtepm See Leuchtspurhaled

Intensity of light

Liderung Lieferung Lieferungung Linie, ballinginche

Habas Linne Lipper Loch

3

Cochquechese Lokoppelvhehol Lokemetivechung

löschen

Liochgerite Liochgerite أمطار محنوسية Läslichkeis Läoung Lorungemier(Lau) Lornetall: Lorning Large

Lukbürber; Lukgene luhdicht were Lufelichte: Lukacwicht

Cufsfrachbronet Lüftdruckminnen Luftdruckwirkung Lufrmann Luftfahrt Luftfahrzeug: Flugzeug LuftBaeche

Luithampiotoff Lufunius(LM) Luftnistele Lufrgehura(LS) Luftochutzenum(LSR)

luftgekühlt

Luitoog

Luftetone; Blasen(See nim Luftdruckwirkung) Luftsoondwelle Luftsorpedo(LT) Luftwaffe Lugar(Perabellum)Piemle Lungenceinstoff

to pack; seal; obturate Obturator(G); see check Luctenceweke Supply; delivery : los

Delivery number Ballistic line; trajectory (See also Flughaha) to the left: fevo Invocoratory: counterclockwine 1 .... Lip; edge; cim Livens projector(CWS) ...

Hole; openingwe Hollow point bullet (See also Hoblisding) Engine yard(RR) Roundhouse(RR)

Decontaminating agent (Ca hypochlorite preparation in powder or in tublet form) (CVS)... Ca hypochlorite alerre(CWS) to extinguish; genuch; sinke(lime); discharge;

nalood(a ahia) Fire extinguisher Salvent solvesdası Solubility Solution Password

Sounding lead; plum Pilot(Nav) Magnifying glass Lynz; recommissions (See maker Passer)

> Air gun; air rifleairtight; hermetically scaled Air deanier Air oressure(Mech): aumon prensure(Met); blast effect; effect of explosion

Blast offers Aeronauticut aviatie Aircreft Compressed air cylindes: onygen flask

Air broke

air-cooled Volatile chemical agent(CWS) Light amored vehicle used with Airhorag(See also under Panzer) Agrial mine Air sistol

Air raid defenne Air raid obelter Vacuum resulting from as explosion Concussion of air caused by sa

explosion; blast effect-Blass wave Aerial toroedo German Air Forces See under Vencons Lung istitunt(CW\$)

HI(Kassas) Macht Magaziageweb Manager (Man)

Handverkarmache(Man Kart) .. Magoverpulver(MagP)

Mantelgeschoes; Verbund ge scho se Magrellengone

Meatelpatross Mancelringrobe Means leaks

Managi paren apporti

Mandes(38.sed II) Marieshad

Marine Marine finh Marine Langer Marriag

Marinemikieterise Marinewalfename(MWA)

Marke. Maring Maschinenflak Maschinengewehr MG: MGew); Kugelapritze Mauchinenkanone MK Maschinenkarabiner(MKb)

Maschinespistole(MP) Maschinenpistole 44(MP 44)

Maschinenachlosser Mechaniker Maschinenschreiber Maskensicherung massanalytisch Massenhegatellung

Mattose

353 mm Howitzer(See unde

Weapons)

Mighty power; force Magazine cifle Moneuver Maneuver(black)tartridee Maneuver(blank)propellant Meatle; envelope; evercost; jacken bullet, projectile, etch -bearli lacketed projectilefeach an sickel-cased or steel conted's:

compound bullers. . lacketed gue Sheathed carridge(cont mjaing) Built-up barrel(G); jackesed barrel(MG) (See also genchiumpines R

and Ringmar) Sheethed emiories Mucton, Nicknamo io SP A/T grass (See under Passer in descriptive per Vene both (Inheratory) wetering place Nevy(See also Liegon

Naval AA.gun Prisoner-of-war camp for ani lora Admiralty of the German Navy Bureau of Naval Ordenoce (Bennch of Oberho dot Eriegomorine) See Reichomark(RM) Morks index mosts labels

See Marinelane Marble AA sutomatic weapon Machine gun(MG)\*

Антомитіс саввов Automatic tiffe of carbine Machine pistol; submachine gun' " Submachine gun(called lare Sturmerwehr 44)

Mechanic Typist

Automatic weapon Meaning unknown to volumetric Fabrication in ser mass production Sailor; apprentice seamon

Mouse; heavy tank developed by Porache (See under Pager)

Nébenprodukt

Nebenschluss

Nest

Seacoass

rifle

Chizel

Brass

Mining shuft

Mining gallery

Mise detector

Mine course

projector)

Mining sifeet

Mine innites

chief, Speer

Mixed metal; allow:

nitric sulferic acid?

Mixture; mixing; blend

Mine awerper(Nav)

Mine-infested area

Trench mortar(lit bline

Ministry of Armements and Van

an alloy of cerium and lanchesum

with some other rare earth merals

Production named of ter its

Mixed sold/such as mixed

Nine field: mine obsessels

Maki Mohlpulver Mehrfachzünder Mebriader; Mehrladegewehl

Meinsel Meiasulapparat; Gaudruck--Meldebaches Meldebiichee, Land Meldebiichen, See

Meldepatrone; M-Patrone Midneg(See also Nuchricht) -

Monsing Managarana MG-Zwillian Miles Milchalas mitticioche Benetanna Militärlaner(Milan) Mine

Missafelds Missanson Mineranne Mineagrechors(M)

Mineshand Mineuleses

Mikesbooks

· Minespulver Mineuraumer; Mineurilumbe Miseroke: Bobelock Minenachacht Mines spects Macantolles; Macagang Minesauchboot: Minenauch Mineamchgeris Minestrichter

mineaverseuchtes Gehier. Minenwerfer(MiWXSee also Grantwerfer) Mineswirk was Hines rindes Ministerium Spec

Mischaetali

Mischeäuru

Mischaug

Max" (TM9-1985-2, p 13) Maximum gas pressure Mechanical fuze Meal: flour: dust: powder \* Finely ground black powder; meal powder Combination fune Magazine-fed rifle; repeating Crusher gage; pressure gage (See also Messei) Meaning container(carrier)

Get 285

Minchung Fp 60/40

mittlere Flugbahn

mittlerer Gasdruck

Mockstahl .

mittleter Fehler

Mirre: Mittel

Mitteilung

Mollie

Houtuge.

Houtan-

Möete l

MOTO'

Moone

Mulfe

Mund

Mundlock

Macornehoullhou

Motortorpedob

M-Patrone(MPace)

Mundlochbüchse

Mundlochistes

Mundstück

Mindung

Mundiochgewinde

Mundlochacheaube

Mundlock(den Zinders)

Montonwarh

Morner(Men)

mit Vernögeeusg(mV)

Mittelkammerachrapnell

100

bomb, called in Ger "SC 2500

Land message container (with yellow smoke generator) See message container (with vellow smoke generator) Ground signal cartridge Mesiege: réport disposele

Pressure gage(Arty),(lit Measuring ugg) to mensure: survey Bore gage Twin machine aw See Militielages Fronted glass

Military occupation Army camp Mine: lead for pencil Aerial mine Mine-field See Minespeller Morter shell; high capacity,

HE misnile Remote-controlled explosivelades ministere took Miss laver

Blasting powder Mine sweeper(Nav) (See also Bamboor) Borebole

Minduar shress on Mündungsenergie; Minduagewacht Mündungsfeuer Mündungsfeuerdampfer mündung sleverirei

Mundungsgeschwindigkeit Mundungskapos Mundungsknall Munition(Mu: Mun) Munitionskaaten Munitionskraftwagen(MKw)

munitionalages Munitionslock Munitionstrager(Mus; Muntr) Munitioneverneckung -

with delay Middle: mean Communication; information Central-burater sheapsel Mean unjectory Average (mean)error Mean pressure German steel made by direct refining of cast iron Centrallite (See in descriptive part) Mounting assembly

Amarol 46760

Mountain; mining; montant paramain in Montan wax Short, large caliber howitzer: (translated also as mortar) Mortar (building material) See under German Abbraviations Engine Motorcycle Motor speedboots

PT boat Motor tomedo boat; PT boat See nader obbenvintings See Meldebatrone Socket: compliag box: bushing; muff

Mouth; opening muncle Adapter poening Fune bale Gaine-type fune-boostes container, bushing to Gaine (See general section).

(lit Fuse hole casing) Adapter opening thread Adapter plug Mouth place Muzzle(G): outlet: mouth(river) Muzzle broke Kinetic Toeray at the muzzle Muzzle flash Flash damper; flash hidet

(See also Fenerdampfer) flashiess(propellest) Muzzle velocity; initial velocity Muzzi e cover; tampina Manule report; muzzle blast Ammunition(Ammo) American box: caiseo Assumition truck

Ammunition dumps sammunition depot Ameunition pit Ammunition carries Amounition packaging

Ammunicion wagon; ammunition Nebelwerfer(NbWSee also Cat; cateson; semmunition carrier Raketenwerfer and Wurf-See under Ger Abbreviations Model; type; pattern; sample Nebelwerfer 41 Mother; mateix; nut; female

Mutternobi a liner Mutterschlüssel

Nachbildung Nachbreaser · Nachfolger(Nachf) Nachineschung Nachleuchten 9 Nachrichs(See also Meldung) aschrichten

M-u R-Patr

Manter

Mutter

Britis v.

Nachrichtanninal Nachrosten Nachziiaduae Nadel Nagel Nahkampigeschütz Nahkampinitee! Nahpatrone

Nabyerfer Niipichen Nase . Nancarachenreisstoff

Nashora

-Namebrandoni v co

Nosogehalt: Nassgebalt Nebel(Nb) Nebelbombe(NbB) Smoke bomb Nebeldecke; Nebelwand Smoke acreen: amoke blanker Nebelgerate Smoke producing equipment

Nebelgeschoss(NbG) Nebelgranate (NbGe) Nebelhandgrauste(NbHgz) Nebeikanten Nebelkerze(NbK) Nebelkerzen Wurf ladung (NbKerzWilde)

Nebelpatrone(NbPatr) Nebelstoff Nebeltopf Nabaltrone

SCIEF

Gun tube designed to teceive Sockes wrench Cap; hat

Hub; nave Dummy; mack up; model; capy · Hangfire Nettogewicht Successor .. Netz . Research; investigation Afterglows phosphorescence Neusceles News; information; ootice:

Neusilber mesuage to sepoist; seaim; correct the enage Means of intercommunication Corrosion: after-rusting

nichtrostender Stabl Retarded ignition Niederdruck Needle; firing pin(Fz) niederländisch Nail . Niederschlag Close-range sun Niet: Niete Close combat material (wespon) Nitratoulver Low velocity carridge used Nitrierbaumwolle for close combat: close-rance Nitziergemisch

round; silencer cartridge (SA) Nitrigrang: Nitration Short cause flame thrower Nitrocellulose; Nitrosellulose (Sec also Flammenwerfer) Nitroglycerin(Nal): Cup: email dish or bowl: Nitroglyzerin blank (for blanting caps) Nitrostykol Nose: cap: stud; lug Nitroguanidio(Nigu) Sternutator: nose and throat Nitropenta(Np); Pentrit intitent(CWS) Rhiaoceros; SP A/T Gun (See un Nitropestabulyer

der Panzer in descriptive part! Nitroutarke wet: moist Nitroverbindung Black powder come 72-75% of Norm · K nitrate (See also Schwarznormieren pulver) Moisture conten porwesiach(a) Sodium Nothtemen Sodium nitrate; chile salmeter Norfener Smoke(CWS); fog; mist

Smoke projectile

Smoke generator

smoke grenade

appen(CWS)

Smoke carreidge

Smoke post CWS)

Smoke agent; acreening

Drum-type smoke container

Smoke band granade

Smoke candle; thermal amoke

Propelling charge for thermal

Smoke shell

101212093

Notaignal Notnignalfakel Nudelpulver (NdP; NP) Nummer(Nr) Nuse Nut Nute Nutsche Nutzarbeit

Notlanduña

Nutzeffekt; Nutzwickung Nutzfahrzeug Nutekraftwagen Nucelant Nutzleistung .

Rocket launcher (lic chemical smoke projector) A six-tube rocket launcher

(See descriptive section) Nebelwurfgranate(NbWgr) Morras smoke-shell Nebelzerstauber Smoke sprayer By-product Nest; pocket(in ore): position consisting of a

stoup of foxholes with shallow connecting trenches net Not weight Nec; setting; gauze; grid; witing system. Religine: recubine(G) German silver; nickel silver niehtbeisanter Sprengstoff Low explosive (lit Nonbrisant explosive) Stainless steel (lit Rustless steel)

Low pressure See holländisch Précipitate; sediment River: pin Nitrate powder Nitrating cotton Nitratian mixture Nitration; natrating Nitrocellulose(NC) Nitroal veerin(NG) ( Nitroglycol(NGc) Nitroguanidine(NGu)

Pentaerytheirol tetranitrate/PETNI Propellant containing PETN Nitrostarch Nitro compound Standard to standardize: saset regulâte Norwegian Emergency brake

See Sperifeuer Emergency landing Distress signal; SOS Distress signal flare(mrch) Chopped cord propellant; nodular poodle propellant Number Nut: tumbler Groove; slot Nutuch: success filter Usefule work Efficiency; useful effect Commercial vehicle Commercial motor vehicle Useful load; pay load

Net horsepower

Ostwine

Ottes

Pack; Paket

Packstoff

Pak-Flak

Panrhes

Pastige

Pagage (Pa)

Pen zerabrailung

Panagrahwehreewehr.

Panzerabwehrzeschütz

Panagrabwehrmine

Psazerabwehrrakere

Pannerbeichiawagen

· Panzerbeobachenagewagen

Panagenerillerie

(PaBefVa)

later called Panaerbuchee

Panagrahwahrkanosa (Pak).

Panzerabwehr

Pakgeschüts\_

Pakeenchucz and

Pak

Packheus; Packhol

Oberheiehlahaber, Oberster Befehlahaber Oberdecke Oberfeldk ommandstut Oberfeldwebel (See also Oberwachtmeister) Oberleperwerker Oberlinche Obergefreiter

Obergrenadies Oberrages Oberkanonies Oberkommado des Heares(OKH) Oberkommando de Kriegamarine(OKM) Oberkommando des Luftwaffe(OKL) Dharkowando de Weitemacht(OEV)

Oberleannest

Oberneasererenedie

Oberpionier Oberquetiomeistes Oberwiter Oberaciónse Oberación Obereter Befehinhaber der Wehrmacht Oberetle umant Oberwachtmeister (See niso Oberfeldwebni)

Officier Öfnung Shop Versi Of Oak Ólbambe Öldruckbr

O-Punkt; Nullpunkt Orgalgenchütz

-

Oel

Ofence

Oppanol

octaless

ortsieste Flak orreferre I aferre Orrungsleuchtsniches Upper; chief; supreme; ... superior . Commander-in-Chief

Housing cap High Field Command Maste, sergeant (except in Arty & Cavy) Master pergeant (Ord) Surface; area Corporal Private let Claus(lufy) Private let Class(Moustain lefv) Privace 1st Class (Arty) Army High Command

High Compand of the Nave High Command of the Air Forces

High Command of the Armed Forces First lieureneau Private 1st class in armored infantre Private let class is encineers Deputy Chief of the General Staff. Private lat class(Cavy) Private les class(lafy siflema) Colonel Commender-in-Chief of the Armed Forces Ligarenent colone Master sergeast (Arry and Cavy See Ol Scovenipe (slang term for 88 mm Rocket Launcher described under Wespons)

\*ou

Aiming point (Guny)

Organ gun; multiple

barrel gun

Scandort)

Order; medal; decorari

Locality; place (See also

fixed: permanent; in fixed

Fixed AAG: fixed AA Arts

homb illuminating ground

Stationary gun mount Ground position signal; signal

Officer Peazerbiech: Panzerpiere Openius; orifice Pagaerbombe without delay (Fz) pag serbeechend Oil bomb penserdure hachingrod Hydraulic brake Panaerbüchse, formerly Polyisobutylenet synthetic called Panzersbuchreswebs substance resistant to Panxerduchachingleistons P mustard gas and Lewisire) (CVS)

Panzerfahrzeug Psezerfahrzeugfalle: Panzerfalle Panzerfahrzenggraben Panzerfaust (PaF)

Panzerfaust 50 Panzerfauer 10 (klein) Pagaergeschone (PaG) pantergeschützt Peazergles

Eastwind; SP AA gun (See under Panzer in descriptive part) PRINTAGE

Pach: bale; buadle; parcel Warehouse: shipping department Packing material; packing See Panaerabwehrkanone A/T-AA gun; dual-purpose

A/T gue Self-propelled A/T gun; Selbetfahrlaierre teak destroyer Same as Paszarkampfwagen V (See under Panser in de-

scriptive part) Tiger II or King Tiger (See under Paszer) Atmor: cuirnner: took (See descripcive section) Took detechment

A/T defense A/T rifle A/T gue A/T gue later called Panagriagerkance

A/T mice A/T rocket Armored simillers Tank with a minimum of aemor and arms; equipped with radio for command use (See also under Panzer)

artillery sporting (See also under Penser) Armor place A/T hombs AP bombs heavy-case bomb armor-plercing

Amored car used for

A/T cifle

Penetration: azmor piercing capacity Acmored vehicle; tank Tank prep

A/T ditch Armor Fine (See mader 44.5 mm Vespons and under Faustpetrone) Formerly Faustpetrone 2 Formerly Faustparrone 1 AP projectile Semos-properted Multiple luminated glass,

resisting builts pracuration

Pausergraben Panuergrange (PEGr. Pzer) Pauxergranate 39 (Page 39)

Passergranece 40 (Past 40)

Pansergrausse 41 (Page 41)

Pagetetapare-Patrone

Paatergrenadies

Psaterarenadier-Division

Peazerhandmine 3kg (PHM 3)

Panzerjäger -

Penzerjägerähteilung Ponserjägergenching Pagaeriaeerkanone Penzerkampfwagen (PaKpfw) (See also under Passer in the descriptive section)

Peaserkampiwagen 1 (Paketw I) Peaserkampfwagen II (Pakpiw II) Panzerkampiwagen III (Pakpin III) Penzerkampiwagen IV (Paketw IV) Panzerkampiwagen V (Pakpiw V) Panzerkampiwagen VI (Pakpfe VI)

Panzerkoyf (Pak) Peazerkorps Panzerkraftfahrzenet Panzerkeniewagen

Panzerleuchtapurgeschous (Pal'spurG) Penzermine; Pauzerwagesmine Prozermine 43 (PzMi 43) Pagzermunition

Panzerpatrone Panzerplatre Panzerachild Paggerachreck

Danverlafore

A/T ditch A/T(AP) projectile APCBCHE (armor-piercing capped, ballistic cap, high-explosive) projectile,

type 39 AP projectile with a tungetes carbide core type 40 AP projectile with a

tungsten carbide core for tapered bore gun (type 41) AP fixed sound of emmunition.

Private in amored ". infantry brigade Motorised division (See also SS-Pearer

gronadier-Division) Magnetic A/T bollow -1 charge 3 kg band mine Tank destroyer (See

line units: amored

combat vehicle

siso [agdpanger) Tank destroyer detachment A/T gun (See also Panzera hwelide anone) Full-track tank with tactical armor and weapons. used in organized front

See under Pansor in descriptive part

Panzerkanone (PaK): Kampfwagenkanone (KwK)

armored head Armored corps Armored vehicles armored car Atmored mount: armored carriage AP-T shot

AP cap; piercing cap;

Tunk gun

A/T mine Magnetic A/T mine 41 AP ammunition; tank ammunition/ Complete round AP abo See Panzerblech Armor-plate shield Armor Terror (88 mm Rocket Launcher) (See under Wannon m)

Panzerschutze Panzerselbstinhrlafette (PaSte) Panzerspähwagen (PzSpW)

Panzersprenggeschoss (PzsprG) Panzersprenggranace (PasprGe) HEAT shell; HE A/T shell Panzerstabl Panzerstäcke Panzertum

Panzerung Panzerwaffe Panzerwagen Panzerwagennine Panzerwurfmine Paggersug

Papiermane Pappe: Pappdeckel Papphilise (für Wurfgranate)

Pappmine Pappminenzünder Parabellum (Luxer) Pistole Parade Marach Parole Partisana Patrone (Patr) (Compare with Kartusche) Patrone 318 (Patr 318)

Patronenauemerier Patronenauazieher Patronenbeutel Patron enfabrik

Patroneofülimzachine Patronengurt; Patronengurtel Patrongshaken Patronunhala Petronunhülse (Patri)

Patronenkasten (PatrKast)

Patronenlager; Patronenkammer Parronenmunicide (Parrille)

Patroneurahmen Patroneurand Patropearaum

Patronenatreifer Pattonentronmel Patropen auführung Tank gunner Armored SP gun mount

Rapid, lightly armored vehicle for reconnaissance (See also Aufklärungspanzer and under Panzer) HEAT projectile: HE A/T projectile Atmor steel Thickness of armor Turret of a tank (lit

Atmored turrer) Armor: armor plating Annored weapon Atmored combat vehicle A T mine A/T neh " morter shell or bomb; A/T hand grenade Armored train (KR): tank plácoos Paper pulpt papier-eulché

Cardboard; paperboard Cardboard cartridge for morter shell Cardboard mine Igniter for cardboard mine See under Weapons Goose step Pasaword See Guerillakämpfer Cartridge (SA): round of QF fixed ammo (Arry) Fixed AP ammo used in A/T rifle 39 (PaB 39); (the bullet usually contained a small charge of lacrymatory

gas) Cartridge ejector Cartridge extractor Pouch: cartridee belt Cartridge factory: ammunition.plant Cartridge leading machine Cartridge belt Shell engactor Collar of the carridge Cartridge case of fixed ammo Cartridge bos: ammunition box

(Compare with the Karturchenmunition) Clip (Rf and AA gua) Rim of a carrridge case Propelling charge chamber in morrar shell Cartridge tilo Cartridge drum Cartridge feed mechanism

Cartridge chamber

Fixed ammunities

Pausepapies Pech Peitung Pendelapparas Pendela des Gaschouses Peodelung

Pentrit Petkansion szünder Perkussion szündhütt

Perkussiossaladase Perlitans (PG)

~ Perstoff Derende

Patrol:

- Pfahl Pfelfe Pfeitpets

Pfelfeigeal Pfall. Pfellgrathess

Pfenoig

Phodesika (PS) Pfeniekraft (PK) Pieniesus Pfiffikas; Phenyldichlomes Pitopien Photests

Phosphorbombe; Phosphor fliegerhoube Phosphorgeschess(PrGesch)

Phosphorgenchose mit Scahlkern Pi-Kaapinittel

Pikrisoner Pilia · Pillesholare

Pilmin Pioniertrappa Pirackbuches

Pila

Pissole (Pist) Pietelespalves Place:

Tracing paper Pitch; esphale; cobbler's waz Direction finding; bearing Pendulum apparatus Oscillation (procession) of a projectile Oscillating motion (See also Seitwärtsbewegung) See Nitropeate

igniting

condition

(CICO.CCI.)

Percussion isnirer Percussion cap Percussion priming of Case steel in pentitu

Dinhongene; superpalice Closest metallic box filled with black powder (used

formerly as a demolitica charge) Kerozene; petroleum Picker stake; post; pile Whistle: pipe Thistling pyrotechaic signal carridge need se

gos alnem. Waistle signal Acrow Armw-type, fin stabilized.

discarding sabot artillery peniectile 1/100 Raichamack or Deurochmark Metric horsepower(1 PS =

0.986 HP3 Horse draught; horse team Phenyldichlorasine (CWS) Wads waddings place stoops Phongua; carbonylchloride (CVS)

Pho enhorse Phosphores bomb Phosphorus (incondinty)

ballet AP-Inc seed core buller with phosphorus Phorphorus assumition Engineer combat equipment

Picrie scid Pill; peller; primer Detonator pelles Mushroom; mushroom head of obsurator;

small pill-box Mishroom land mine Corps of Engineers Scalking rifle; busting cilfe.

Pistol Pistol propellant Place (Tech); phonograph Plättchenpulver (PeP) Plattrapulver

Platz

Platzpatrone (PlPatr) Plasapatronengerat

Plombe Plongierechus Plass porumetischen Genchütz Polizier, Schutzmann

Polklemme Poten" Prohis Prailechuse: Preliachuse Pressling (Pt) 200

Pressluft Presh-stoff (PrS) Pronamedizous

Performance Primarindung; Aufladung prinantischen Pulver

**Probauchiausen** 

Profil profiliers

Progressiverall; much mender (trechseuder) Drall Progressivpulves

Propagandageschess 41 Propagandawerfer

Protes (Pt) Propertuate Printgerit

Pulver(P) Pulyerbrens rande

Pulverbrunazinduna Pulverbündel Pulveriabrik

Pulverfüllmaschine

Disk peopeliant Rolled propellant; sheet propellant Place; square (in a city or town); space; sirdrome; landing field Black certridge Vespon for fixing blank caggidges Land seal Plunging fire; morter fire . Explonion Paramatic gus Policeman

Barrery terminal binding post (Elec) Power (Math) Barge; lighter (Nav) Ricochet Pressed anicles molding; beiquet Compressed air Themosetting plactic; (lit Present maserial)

Forged tool See Phosphorguechous Primary charge, of a cap or of a deconator Prismatic propellant Tent: trial: coper: sample (See also Profung) Teet firing

Profile: troes section: tread of a tire brailmeers lacreasing twist of rifling; progressive rifliag

Progressive humina propellant: progressive propellant Leaflet projectile 41

Launcher for leafler piolectile Limber (Arty) Percentage Testing apparatus Proof; test; testing: assay; trial; verification;

examination Test firing proof firing Buffer; shock absorber Formation (Ave alane):

boat-type runner placed under gum wheels for operations in deep snow Propellant; powder Powder-train legition

fuse (See also Doppelaunder) Powder-train ignition (Fz) Propellint bag Explosive plane; powder

Apperatus for chermine carridges with powder

Pulverkamaer; Pulverni Pulveckastee Pulverladona: Pulvertre ibladuo. Pulvemantchen Pulver obse Lössag (POL)

Palverprosskörner

Pulverrann Pulversing; Pulverentarina Pulsernary

Pulyersacuzeitzunde Pulverschlauch Pulverspreagetoff Palvetetash Pulvertreibladung Pulveretütze Punktiouer: Punktuchieseer punsen Püppchen

Рирре Parentack Patawalle Pyrotechnik (See Fenerkunst)

Quadrantunvisies Onedree Qualm Queck silber Onelletoff: Quelleubs

Quellung Quellungevernögen; Quellvermögen

Overdeckungt Queronli Queruchläger

Querschnitt Querachaitzbelastung Queratreums; Breiten streu

quetechts

Quetschlaha Ouetachledvas

Overnchmins Onetschmühle: Quetschwett

Racks

Rechestelzatoff

Propelies or powder marazine. Propellent or powder chember

Ammunition box (lit Powder box) Radfahrabteilung Propelient (powder) charge Powder Cup Solventiess propellant; powder without solvent Powder compressed into large cakes

See Pulverkamme Powder ring (Fz) Powder train (Fz); powder peliet; powder composition Powder train time fuze Ouick match

Low explosive Powder dust See Pulverladuag Propellent support Point fire: converging fire to ounch: cut: carve

Little Doll; 88 mm Rocket Launcher (See under Vespons) Dummy (for bayones, etc) Cleaning sod Cotton waste (for cleaning)

Pyrotechnics; pyrotechny

Quadrant sight Square Dense emeke Hercury; quickailves Substance that swells (such as NC) Swelling; scaking

Swelling power across; obliquely: MARTERIO . Tranverse (Fort)

Ricochet; obliquely striking projectils Cross section Cross-sectional load Lateral dispersion; deflection dispersion (Ball) to crush; bruise; squeeze;

pinch Pinchcock Camouflet (See acutta) section) Crushing mine Crushing mill; crusher

Revenge: vengennce(See also Vergelrung) See Nasenrachenreiastofi Wheel; bicycle

Radachee Radeclaterre: Radlaferre (RL) Radiogesteuerterzünde

Radkappe Radnabe Radresfeo - Rabmen Rabmeniades

Rakete Rakete mit festem Brennstoff Rakete mit flüssigem Breaustoff Raketensorrieb Rakentenapparat

Raketenbombe Raketeneeschoss Raketenpanzezbüches (Ofensohr)

Raketenstart

Raketenstartbombe Raketenwerfert Rakeceswurfmanchine Rakerenwerfer 43 (RW 43) and Rakerenwerier 54 (RW 54)

Ranme Rampe Rampennin

Rand Renddiagenodes candeln: rändern Randleuerpatrone randless Parross Randpattone Randpatronenhüise Rasanz der Flugbahn enscher Satz

Raspel; Raspe Russ Rauter Ranthebel Rauch Rauchballpatrone Rauchbündelpatrone

Rauchentwickler Rauchgranate Rauchkerze Rauchkörper (RK) Rauchkorper für Schiederichter (RKfS) rauchios tauchloses Pulver Rauchmeldepatrone

Wheeled gun mount (carriage) Bicycle detachment See Abstandzunder Hub cap Hub Tire of a wheel Frame; clip Clip londer; magazine loader Racket Rocket with solid fuel

Liquid-fuelled rocket

Rocket propulsion Rocket launcher (See also Raketenwerfer) Rocket bomb Rocket projectile Antitank rocket launcher; bapooka (See under 88 mm Wespose) Rocket-assisted take-off (Ava) Rocket-assisted bomb

Rocket Isuncher; rocket amiecon Rocket launchera 43 and 54 (See under 68 mm Wesness Ram; rammer; pile driver Ramp; platform Ramp land mine (improvised. mine under an inclined board)

Rim; flange; edge; border Rimpent fune to knurl; crimp; edge; tim Rim-fire cartridge Rimless carridge Rissned cartridge Rimmed carridge case Flatness of trajectory heal-powder composition (Pyro)

Rasp . Rest; north; detent Screen Rest lever; notch lever Smoke: fame; vapor Smoke; tume; vapor Smoke-pull signal cartridge Smoke cluster cartridge; 'four smoke trails signal cartridge Smoke generator; smoke box Smoke shell >

Smoke candle (CVS) Smoke filler (Ammo) Smoke-ouff charge foruse by umpire in maneuvers smokeless See rauchschwaches Pulver Smoke signal carriage

for dropped messages (Avn)

Reicheluftfahrtminlotzeium (RLM)

Air Force Maistry

Rotes Kreux

Rockreuz

R-Patrone

Red Cross, tier marking on

tine fuzes of some actillery

shells not contg porson gases Smoke-puff cartridge:

Hesh and sound cartridge

(lit Salt cartridge)

Hydrochloric scids

Flash-reducing wad

CODER SOME SALES

Storage battery

Send bath

muriatic acid

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Court Manager street           | Reichsmark (RM)               | Monetary unit beofre 1947,            | !     |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------------------------------|---------------------------------------|-------|
| lauchnotzeichen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Smoke distress signal          | Very amount (UN)              | equal to about 23 cents.              | 27    |
| auchpatrone (RPatr)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | See Rauchaignalpatrone         |                               | Presently called                      |       |
| anchroht.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Tubular smoke generator        |                               | Deutschmark (DM)                      |       |
| tochsetzi .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Smoke composition; smoke       |                               |                                       | 1 3   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | signal                         | Reichspatent; Bundespatent    | German patent                         | 201   |
| ochschwaches Palver                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Smokeless propellant (liz      | Reichweite                    | Range; maximum range                  |       |
| ee also rauchioses .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Propellant giving little       | Reifen; Reif                  | Tire; (ing; hoop; tire; band          |       |
| ulvet)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | smole)                         | Reifenpanne '                 | Puccture; plowout; flat tire.         | 100   |
| anchachwimmer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Floating amone pot             | Reibe                         | File; row; series                     | -     |
| auchaignalpatrone; Rauchpatrone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Smoke signal carridge          | Reibenladung                  | Elongated charge                      | i     |
| auchapurgeschosa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Smoke graces bullet            | in Robe gefüllte Reitenladung |                                       | -     |
| enchipurpatrons                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Single emoke trail signal .    | Reibenscheltung.              | Connection in sesies (Elec)           | 1     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | certtidge                      | Reiheirwarf                   | Train release; train bombing          | i     |
| auchamichpatross                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Sanke street signal cartridge  | reia                          | pure; clean                           | 1     |
| anchrothag: Rauchachlaist                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Smoke currain; smoke acrees    | Reinheiteprobe                | Test for purity                       |       |
| inchwolke                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Smoke clous                    | Reinigung                     | Purification; cleaning                | 4     |
| auchanichenpatrone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Smoke signal cartidge          | Reinigung shikrate            | Bore brush; cleaning                  | i     |
| with the state of | Space: room: chamber; volume   |                               | brush (Ord)                           |       |
| nson<br>namblidentfernung mussom                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Surrencepic range finder       | Reinablei; Graphix            | Graphite                              | i     |
| numbiost (R. Boot)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Mine (weeper (See also         | Reissannader                  | Friction(pull) ignitur                |       |
| America (R-1906)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Mindulames)                    |                               | on brimes<br>Lesection(herr) (fortune | i     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                | Reissleine                    |                                       | - [   |
| Aumshause .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Stereochemistry                | reitende Artillerie           | Rip cord                              | 1     |
| numbi cher                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Density by volume              |                               | Hotse metillery                       | 1     |
| aungewicht .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Weight per unit volume;        | Reiter                        | Rider; borsemen;                      | 1     |
| 91                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | belk density                   | At a second second            | private (Cavy)                        | 1     |
| speisbalt; Rapagehalt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Volume; cubic capacity .       | Reinergewiche                 | Rider(the weight)                     |       |
| Aumotter , .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Paravana                       | reinender Enmpfacoff          | derient agreet;                       | i     |
| Aupe .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Carerpillar, carerpillar track | •                             | Incrimetor (CWS)                      |       |
| augenlalette                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Caterpillar mounting (G)       | Reingao.                      | Irritant gas; test gas                |       |
| Auponechlopper                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Caterpillar tractor            | Reingeschons                  | britant gas projectile                | 1 ' ' |
| -Boot                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | See Raumboot                   | Reinopott                     | Bricane; harassing                    | 1     |
| esgenz (pl Rosgenzien);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Reasens                        |                               | agent (CWS)                           | 1     |
| esktionemittel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                | Repetierwatte                 | Repeating weapon                      | 1     |
| echengeria .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Calculating apparatus:         | Reserve                       | Reserve                               | 1 /   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | computer                       | Reserve I                     | lasctive reserve of                   | 1 "   |
| echas echiabar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Slide rule                     |                               | fully trained men                     | 1     |
| echtadrali                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Right-handed twist of          |                               | under 35.                             | 1     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | sifling                        | Reserve E                     | Inactive reserve of                   |       |
| chtadrehead                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | destrocountery; clockwise      |                               | partly trained men                    | 1     |
| chenginals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | right-head (threads, ect);     | -                             |                                       | 1     |
| renogangig.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                | Reservezindens                | under 33                              | 1     |
| -t 1-1-11-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | clockwise                      | wearetermone's                | Auxiliary ignition lead-              | 1     |
| rchtswinklig                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | rectangular                    | A                             | in (blasting)                         | 1 .   |
| ndusterung                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Reduction                      | Reus                          | Residue; remainder;                   | 1     |
| alesus .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Absences reviews report        |                               | rest                                  | 1     |
| egel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Rule; standard                 | · Restflugweize               | Remaining mager                       | 1 -   |
| egelung                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Regulation; control            |                               | v straight-line distance              | 1.    |
| égendecke -                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Tarpaulin                      |                               | between point of                      | 1     |
| ehpomen ,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Buckshot                       |                               | burst and theoretical                 | 1     |
| eibahla                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Resmet                         |                               | point of impact                       | í     |
| ibes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | to rub; gried; triturate;      | Rettungsbaje                  | Life buoy                             | 1     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | ramp; grate                    | Retrongafahrneng              | Lifebont                              |       |
| elbedrake                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Friction wire                  | Revolverkagone                | Revolving common                      | i     |
| eibepulves .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Abensive powder                | Revolver mir Vieder-          | Double-action                         | 1     |
| elbus gebromes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Friction brake                 | spanasbaug                    | teachet<br>Popula-rector              | 1     |
| eibus sakoeffiziest                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Coefficient of friction        | richten                       |                                       |       |
| ei buagapeobe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Friction test                  | ,                             | to direct; point a gun;               | 1     |
| wibus samudants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Friction detonating train      | Richtfernrohr                 | sinc Judge                            |       |
| eibandecks abs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                |                               | Telescopic sight                      | ! _   |
| eich seastait                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Friction primer (threaded)     | Richtgernt                    | Aiming device                         | : ^   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Government Institute           | * Richtung                    | Direction; pointing;                  | 1 '   |
| leichedruckerei (Rde)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Government Printing Office     |                               | laying (of a gue)                     | 1     |
| eicheierschangerer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | State Research Council         | Richtungshörer                | Sound locator                         | ŧ     |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 4 is Fores Minister            |                               |                                       |       |

Richtungoschiesses

Adjustment fire for

direction (See also

Einschiessen)

| Riefe                       | Groove; channel                               |
|-----------------------------|-----------------------------------------------|
| Riefelung                   | · Channel; groove; cannelure                  |
| Ricgel                      | Bolt; sail; bar                               |
| Riegelblock                 | Breechblock                                   |
| Riegelmine                  |                                               |
| Ricmen                      | See R-Mine                                    |
|                             | Strap; sling; belt                            |
| Riffelmichter               | · Ribbed funnel                               |
| Rille                       | Connelure; groove; furrow                     |
| Rillenquaition; R-Munition  | Rimmless carridge case                        |
|                             | for ball SA Ammo .                            |
| Ring                        | Ring; link; band; loop                        |
| Ringcolage                  | Ring layer                                    |
| Ringgrannto                 | Ring shell; shell with                        |
|                             | pre-arranged fragmentation-                   |
| Ringknoose                  |                                               |
|                             | Built-up gun; jacketed gun                    |
| Ringpulves (RgP)            | Annular or ring propellant                    |
| Ringrohr                    | Built up barrei (G)                           |
| Ringstitus                  | Ring on triped support                        |
| Risas .                     | Channel; groove; furrow;                      |
|                             | gutter                                        |
| Rippe                       | Rib; cooling fin of an air-                   |
|                             | cooled engine                                 |
| Ricuncister                 | Captain(Cavy)                                 |
| R-Mine; Riegelmine          |                                               |
|                             | Cross bat land mine                           |
| R-Munition                  | See Rillenmunition                            |
| Röchlingsgranate (RöGe)     | See in descriptive part.                      |
|                             | under R                                       |
| Roggen                      | Rye                                           |
| Robeisen                    | Pig iron                                      |
| Robol                       | Crude oil                                     |
| Robe(R; Ro)                 | Tube; pipe; gun barrel                        |
|                             | · (See also Lauf and                          |
|                             | Genchützrohr)                                 |
| Rohrsbautzung               | Erosion of the bore                           |
| sometenessed.               |                                               |
|                             | (See also Ausbrenaus                          |
|                             | des Rohres)                                   |
| Rohrbeeite                  | Caliber (See also Ealiber)                    |
| Rohrbeemse; Bücklaufbeemse  | Tube brake; recoil brake(G)                   |
| Röhre (R; Ro)               | . Tube (radio); nonzle; spour;                |
| •                           | duct                                          |
| Röbrenlaferra               | Tubular mount (G)                             |
| Röhsenpulver (RP)           | Tubular (perforated) propella                 |
| Robefrei (Rf; R frei)       | Empty gus batrel                              |
| Robrinneres; Robracele      | Bore of a gun                                 |
| Robitage                    |                                               |
|                             | Tube carriage                                 |
| Rohrladung Stahl, 3kg       | Bangalore torpedo, 3 kg in                    |
|                             | excel pipe (See also in                       |
|                             | Rohr gefüllte Reihenladung                    |
|                             | and gestreckte Ladung)                        |
| Rohrmaneel                  | Gun tube jacket .                             |
| Rohmindung                  | Muzzle of a gun                               |
| Rohrücklauf                 | Barrel recoil (G)                             |
| robraicherer Zänder         | Bore-safe fuxe                                |
| Rohrsicherheit des Zünders  | Bore-safety of fuzz                           |
| Rohrweite; Kaliber          |                                               |
| B-1                         | Galiber                                       |
| Rohtzange                   |                                               |
| ,                           | Seillson wrench                               |
| Rohtzetspringer             | Premuture in a gue                            |
| *                           | barrel                                        |
| Robatolf                    | Raw material                                  |
| Rolle                       | Roller; roll                                  |
| Rollantombs                 | Rolling mine                                  |
| Röntgenotraklen; X-Straklen | X-rays                                        |
|                             |                                               |
| Rost<br>meefrel             | Rust; grate; grill<br>moncorrosive; stainless |
|                             |                                               |

Riickdrack Thrust reaction pressure ibbed funnel (Rock) ennelure; groove; furrow Rucklauf; Rückstons Recoil immless carritige case Rucklaufbremse Recoil brake (G) or ball 5À Ammo Recoil mechanism Rücklaufeinrichtene ing; link; band; loop Rücklauflas (Rf) Recailless ing layer Recoilless gun Rucklaufloses Geschutz ing shell; shell with (R(G) re-arranged fragmentation Rücksching Blowback (Ord); uilt-up guni jacketed gun back pressure unular or ring propellant Rückstoss: Rücklauf Recoil; kick(Ord) uilt up barrei (G) Rückstossfrei (Rf) Recoilless ing on triped support Ruckstossfreickanone Recoilless gun bannel: aroove: furrow: (RFE; RIK). Rückstossfreierwerfer Recoilless läuncher ibt cooling fin of an air-(RIW) poled engine Rückstonslades Recoil-operated aptain (Cavy) automatic weapon ross bar land mine Rückstosamgtor jer-propulsion engine ee Rillenmunition Rührer; Rührapparat Stirrer: agitator ee in descriptive part Rumpf Trunk; toreo; sder R fuselage (AC) Rundblickferurokr(RbIF) Panoramic telescope ig iron Tour: round: circle: curve Runde rude oil Rundfunkaendér Radio broadcasting ube; pipe; gun barrel BEBEROO ee also Lauf and Ruadgeschoss Round bullet enchiitzrohr) Round nost bullet Rundkopigeschoss resion of the bere Spot: ismphlack Ruas ee also Ausbeenquas Rilstung Armament; equipment es Rohres) Röstungswerk Atmoment plant: war-plant aliber (See also Kaliber) rimela' vo ahake: jolt ube brake: recoil brake (G) ube(radid); nonzle; spour; Siibel Saber: sword Sachindex: Sachresister Subject Index ubular mount (G) Sack Bagi sack; pouch ubular (perforated) propellan Saft Juicer electric currer mpty gun battel Segement Sawdust ore of a gun Salmiek Sal ammoniant Am ube carriage angalore torpedo, 3 kg in chlorise Salpeter "Saltperer: K nicrare: reel pipe (See also in Siter . obr sefüllte Reibenladung Salperergrube \* Salmeter nine d gestreckte Ladung) un tube incket Salpeterbiina Nicer works Salpeterseure Natric acid uzzle of a gun Salpeterschwefelsänte Mixture of nitric and arrel recoil (G) aulfuric acids; mixed acid ore-safe fuxe Salpetriee Schwefelsaure Natrosylauliuric acid ore-safety of fuzz Salvenfeuer Salvo (or volley) fire aliber Salvengeschütz Automatic gus ipe wasach; Salz Salt talison wrench Fissh-reducing wad Salzkartusche remuture in a gua

Salzašuro

Section

Salzyorladung: Salzyorlage

Samueler (batterie)

Send paper

Pellet primer

acidic; same

Acidimeter

Box: case

Street wave

Live shell

Hinger joint

pane (of gines)

Disk propelings

Windshield wiper

Scabbard: shear!

Searchlight: projector:

spotlight; headlight

Shears; sicissos

Shewing strength

Umpire (maneuvers)

State; schist; shale

" Rifle grenade launches

Rail: strip: straigeal splint

Doney must

Shour mire

Shear plate

Shear pin

Guncotron

(discharger)

See Schnellbook

Scraper; gracer

Send test; dust test

Nickname for 1800 kg

faze composition disk

Column; pile; pillar

Acid; sommess; scidity

Seencil; remplare; model;

Shaft(mining); bomb rack

Dish; basin; bowl; bush; bash

Shaft, stock: handle

Sound: ring: revocance

Silencer (Ord); muifler

to insert shift switch

sherp; pointed; acure:

Activated A/T mine

sened: primed: Live (Assoc)

Live cattridge; ball cartridge

Shovel; scoop; paddle; blade

Disk: place: practice cargett

Foam: frosh: scom: luther

to acm (Ammo); to activate

a miner to faze a shell

Sharpshooses ; maiper

Sharp shooter's rife

Live ammunition; service

Satapille Securios Carrentel

660- P Sameretali Savaratolitrage Saure Sagringener S-Boot Schole Schole

Schack Schuches Schaft Schale Schall Scholldings Schallweile ncha less acharí

schoole bisoltion

acharle Propernies schorie Patrone echarigeladene Grana **polyaches** arbarismiles Scharlachiere Scharfschärbunge Schemier Schabfel Schaus Scheibe (Schb)

Scheibespulver Scheibenwiecher Scholder Schainning Scheinwerter

Schools Scheriestigkeit Scherplette Scheretift Schiederichen Schle/er Schlene Schlessbaumwolle: Schiegemolie Schlessbecher

Schiessen achiessed (achoes. genchossen) GP-HE Bomb, called is Schieasplatz; Vaffenprüfungsatelle Ger SC 1800 Saras (TM 1965-2, p 12) Saturation; extinfaction Ser\_composition; unit; Schiesepulver. Schiege-stock (am Gennarwerfer) deposit; sediment; pellet Schiene-exoffweee Time train ring (TiFa) Black powder pellet (TiFu); Schienewenen: Oxygen (lit Sour aubstrace) Schiff

Schioonlahre Schiegewollpulves Oxidizer(lit Oxygen carrier) Schiffbanwertz: Schiffameett Schiffekanone (SE) Schille Schirm

Schirmlafets Schlacht

> Schlachcllotte Schlacke Schlag. Schlagholum

Schlagempfindlichkeit

Schlagfeder Schlagledung Schlagion Schlagrohre

Schlagacift . Schingrersuch; Schingprob Schlagwetter schlagwenersiche Schlagwerterversuchastrocke schlagweitersändfühie Schlagzijodes Schlagzändschraub Schiamo

Schlange Schlauch

> Schlauchboot Schlauchklemme Schleifmittel . schleppen Schlepper Schlappenrpede Schlauder Schleuderguns

Schleudermachines Abachleuder-mechine Sch! endermine Schlaudersture

to shoot: fire Proving ground; artiflety range Gunpowde Rifle grenade rod

Green

Powder business; all that concerns propellants and explosives Gunnery; Ballistics (See also Astilleriniscann) Guacorton propellant Ship; vessel Shippard By ...

Naval suc Shield; label; signboar Screen; umbrelle; parachure; cover (See also Fallechirm) Gun mount protected with a shield Bartle

Fragmentation bomb carried by a fight pleas. Battle ficet Slag; cieder; clinker(in coal) Shock: stroke; blow Firing pin; inertia striker

peller(Fx) Sensitivity to shock (to blow or to impact)

Striker spring (Fz) Booster charge; masarias charge (Fz) Heed solder Percussion tube: triction

tube (primer) Striker (Pa) Impact test; percussion Firedamp Safe against firedump

Testing gallery ignitable by firedams Impact fuze; percussion fuze Threaded percussion primer Mud; aludge; blime; aluny Soake: coil: hose (flexible tube); spiral

Tube: tubing: pipe (flexible): bose Porumetic raft Tube cismo Abcasive to tow: drag

Eractor: tue wed torpede contribuge; aling; catapul: catrifugal casting (foundry)

Centrifugal machine CALADRIT Sling mine; silding mine Catapult take-off (Ava)

Schliff Schlitten

Schlies Schlone Schlot: Schlotte Schlüggel Schlängel graber Schlässelmine

Schlieren (nl)

Schmalapurbaha Schoolspeaks Schmet ' Schmerrel Schmetterling

echniedber Schmiedd Schmiedeeluee: geochmie detes Eises Schmiermittel: Schmiere Schmiesöl

Schmierner Schmirgel Schoobel Schoolle Schnauze Schoocke

Schoockenmieby Schneckenrad Schookette Schneewenne

Schoolde Schoolder Schoolboot: S-Bo

School/sucreeschitz Schnellfeuerkanone School Ladekanone Schoell Ladverschluss

Schnell Ledung Schnell Lat Schnellzüeder Schneppe

Dellevin Schour (See also Zündschnur) achrag Schrüglinie Schrank Schrupnell (Sr Schr) Schrapuellmine (S-Mi: SchrMi)

Schmube Schraubenfluggena Schraubenmutter Schraubenschlüssel Schroubenzieher Schraubkappe

Schraubetock

Strenke: strine: schlieren Schreck ' (segions of varying refraction, ne in liquids and gases) Grinding: sharpening Sled; sleigh; sleigh mount;

Slit; elot; fissure Lock: bolt mechanism; castle Smoke stack Key; wrench; capher code Main creach Activehicle mine laid as road block (lit Key mine)

Name ease sailroad Melting point Fat greate; suct Emery -Batterfly (nickname of a guided missile)

maileable Force: smithy Wrought iron; sorged iron. mallenble ima Lubricant Labricating oil Labrication

Emery Beak: bill: nozzle: core Buckle; clasp; gunsling hook Secut; mouth; nose; sozzie; spout Worm (Mech): endless screw;

spiral

Worm gent Spow chains skid chain Boat-type tupper placed under gan carriage wheels for operacions in deep snow Edge (of a knife, bayonet, etc) Currer Tailor

Motor torpedo boar; PT-Boat; F-Bost Repid-fire guo: quick-firing guo Rapid-fire casson; quickficing cappos Rapid loading gun

Rapid loading breechblock Emergency demplition charge Instantaneous fuze; nondelay fuze (See also empfindlicher Zünder) Spoutt spout; nozzle; lip Cut alice: section: intersection

Rope; word; twine; string oblique; aloping; inclined Diagonal Cabinet case; closet; cupboard Shrapuel Antipersonnel mine (lit Shrapnel

mine) (See also Schutzenmine) Screw; propeller Helicopter Not (Tech) Wrench Screw driver Screw cap

Vine (Tech)

Schreckindung: Schreckmine

Schrotgewalu Schromattone Schub

Schulbomb Schuld

Schi-Mine Schuppe Schoon

Schugsbeobschtung

Schunsbereich Schussfolge Schus stafel Schupavergager Schusswaffe Schussweite (grösste Schussweite)

Schusswinkel Schützeltzichter Schüttkaaten

Schäre Schütze

Schützengrabenkanone Schützenhöhle . Schützenmine (Schüldi: S-Mi) Schützenpanzerwagen (SPW SPage)

Schutzfeder (SF)

Schutzeles Schutzgchild Schutzgraffeln (SS)

Schwaden Schwadron

products

schwingero Schwankung Schwanz Schwarzkrens

Schwarzoniver Schwebs schwedisch

Fright: textor Booby trap; buoby mine (See also Sprengfalle) Shot (for shotgue, pellet; cut: piece Shotgun

Shots an shell Suce: 5A scabbard or holater Training bomb; dummy bomb Debt: fault: blame

Same as Schützenmine Scale: flake Shot (discharge of a firearm): round of ammunition: biner Observation of fire (Arry): spotting

Range of gun; danger zone Rate of fire Range table: fitten cable Dud: miss Fireson Range (See also Entferning) (Maximum canee) Fizing angle Separatory funnel Container with a number of

small bombs; "Moletov. Breadbackers; bomb maga-Relay (Elec) Private (infy); riflemen; sharpshooter Trench sun; trench morts Dugout; foxbole

Antipersonnel mise (See descriptive part) Multipurpose armored car Tused for carrying troops or equipment) (See also

under Panzer) Protective spring; safety aprios Bulletproof glass

Protective shield Elite guard of the Nazi

Protective wall (system of land defenses, such as Westwall) Suffocuting vapo: or ex-

balation; gas cloud; ponious gases; detenation Tero (Cavy)

to impregnate; asturate; Inseminate Fluctuation: variation:

pacillation Tail: trail (G) Black cross (Ger marking for diphenylcyangeine) (CWS) Black powder

Suspension: sling Swedi éb

Safety match (lit Swedish Self-propelled (SP) mount; echwedisches Molaches Seibarfahrlaferre (Sf: Sfl) 'aun motor carriage (See also Schwafel . Salfue under Panzer) Astimony sulfide (SA.S.) (Geschütz auf Selbstishr-Schwefelanzings (Salf-propelled aux) Schwefelniere Sulfune acid informa) Solfur triozude (CWS) Schwefeltriozide Selbathadeeinmeckiauf Subcaliber barrel for nemi Hydrogen sulfide Schweleiwasserstaff automatic weapon Schwelligsawe; achwellige Sulfarous said-Salbatladasawahi Semiautomesic rifle: self-Seere landing rifte to weld; sweat achwereses achweles to burn slowly, ampides Selberledepistole Semiautomatic piscol: selfloading piscol Smoke candle (CVS) Schwelkesse Seibetlader: Selbes Semiauromatic weapon; sulfschwallen to swell; distend Panicy amag lade waffe loading weapon Schwenneri Selberschrungfung Self-abrinkage achmen heavy! Medina artillusy (lit schwere Artillerie (nA) Selbérverbresanna Self-destroying type of fuse Heavy smillery) Selbstresserzena Spontaneous decomposition Olie) peridual areas (all) Medium howitzer (lis Selberguadung See Selbatentziindung Heavy bowisans) Sender: Sendeger Radio transmitted Shipment; transmission (Rad) schwere Kaneud (sk) Medium gas (lit Heavy Sandung Mustard gas (CWS) Sonfann Yperit echware Passerbacker Henry sacitant ave denkrecht vertical; perpendicular Force of gravity Scoknag. Sinking lowering hollows Selementen fr achreres Marchipangewell Heavy MG depression Heavy artillery (lit Heavises Senuitivity: nenaitiveness schwerzee Artillery (BisA) Segnibilität artillery) Secienfabrikacia Production in series Sabmon Speakafter Kampfetoff Persistent chemical werfare Man West; life vest. Schrimmron Schwingungs Solvensa Vibration: escillation S-Ganchone See Spitzgeechous achwimen. to white bean contribute nicher nafe; secure Schwenggewich Sicherheitsbettich Pendulum Safety tank; drowning tank Vibratian powers reservings Sicherhaitudeale Safety wice (Ord) Schwenkenb Sicherbeituglas Safety glass; shatterprior feeca Crowings Schwanzanechine Fiveheel Safety Masting powder Schwangred dicherhaireminessini ver Santile cariel: Santinews see Naval aviation Sicherheitem reacomit Sefety explosive Suspines; hydropless to make na/e; lock (Oct and . Suell ug zoug nichem Seele Born (of a gua) Ammo); cover protect; make Soulenechen Asia of the hore Seelendering rasen Seelen Dissector (caliber) of the bore Sichermanakapon Safety device (Fa): anfety (See also Kaliber) cap (HdGs) weise Sectioning Gen barrel leneth Sicherungsklappe Salety valves nafety batch Seitleamh Tabes liner (of a gua) Sicher-ne amente Lock aux Nantical mile (1.855 km) Safety pin (Fx) Seemaile Sicherung serift See mine; underwater mine Sicherung svoreteure Arming pin (Fz); oulety pin (B) submacine mine Sicherung saunder Safety fune Sight; visibility Submarine mine field Seezinder Hydromacic both fune (in Sichtfeld Pield of view depth charges) Sieb Sezelflugseug Glides earlplane Siedeno wke Boiling point Sailboar, glider Siggisied Kapone 380 mm Railway Gun (See Segler Segmented shell Semmentaranec under Vemons) Periecopes telescope (Lie Signal bombe Signal flore Seeing tube) Signalbatrone -Signal contridge seigere to exude ; 'Side; fače; direction (Guny) Signal rekete Signal rocket 'Seite Signalwerfer Ground signal projector Seizenlones Enfileds fire Silisiustetrachloris Silicon tetrachloride Bayonet (Lit Side aco) Seitengewehr Deposited natter sediment Seisenverechieben Drift correction Sipo (Sicherheitspolizei) Security police Seiten wagen Sidocae St. S-Miner Schull See Schrappolimine and Seitwartebeweging Yawing (See also Pendels Schützenmine des Geschoeses) S-Mine Verbindungsetilch. Three-way adapter for S-Mine Sekundürladung Secondary charge; base charge Drilling (of a detonatue) Sockellafetoe (SkI) Pedestal mount (G) Selbstestanding Selbstranding Spootnesses ignition Suction

Sale; bostom of a treach Salder Soldier Solvens (pl Solvension) Solvent Sonderestillerie Sondergerist (SGer) Sonderkarrusche (SKart) Sandeskenistahrneus (SdKfn) Spaderladone: Augustus Sondernmition (Sunt Schie). Sonderwalfe (5d9) Spinbuogen (SpWg) Spait; Spalte Spaltaniage device Spulconlane mer Gewinnung ven Cleve oue Rückenure Spalchask bunder Spategi ühzünde Spattring Spolezindes Sonitaindermochine Speratoff deleases. Sourt area Spicaerapringer Spitzinder, Versierrunge zündet Spirründene Speat Spenballos **Бретте** Sperahola Sperreruschaanstalt (SVA) mines spezifisches Gewicht Spiegel ship) Špiegeltelegety h Spiegelvisier Spindel Spiralbohrer Spirulfeder Spirue (S) Spiragenchous (Sc SGrock)

kem (SmE)

kem (SmK)

200000

Separate; special; exclusive Heavy anillery (In Special astillesy) Device serving a special pumps Special propelling charge in charge cartridge Specialized vehicle, such as tank, tank destroyer, etc (See also under Pauser) Super-charge Now-fixed ammunicions epecial outpose emmunities Special purpose weapon Scout car; reconnaisance vehicle See under Ger Abbreviations Crack: oplit: slit: fisome Cracking installation; splitting fastallation for recovering oleum from spent sold by splitting process Imp-mark electric isniter High-tension electric igniter Solit ring (breechblock) High-spasion demoares Exploder for high-tension detonator Cocking mechaniam Scarce material; high priority Experts steam Retarded burst; delayed action o miectile delay fure Retarded ignition Burage balloos Block; obstacle; berriet Barrage Sire: barrage Plywood Outer steam tube of MG Naval catablishment working or development and testing of sea Specific weight', Mirror: periacope; sters (of s Heliograph Mirror night Spindle: pinion: genr nhaft . Twist drill: spiral drill Spiral spring helical spring Point tip Pointed bullet Pointed beilet with iron core; Spitzageschous mit Eisen-SAP builes Printed built with steel core: Spitzgrachosa mit Stabl AP ballet

to crystalline out; precipitate

Spitzgeschose mit Stahl-Pointed bullet with hardened kern (gebärtet) [Smk (H)] steel core; super AP bullet Spitzgeschous mit Stahl-Pointed bullet with steel kern und Glimmenus (SmKcore and dim tracer Gl'apur) Spitzgeschoss aut Stahlkern Poissed bullet with steel core und Leuchtspur (SeaKI, spur) and tracer Spitzmunition (SMn) Pointed bullet ammoution Spiersung Spiresung Splice Spling Splint; cottet pin; split pin Solitter Sommertick Splinter, fragment (Proi) Splitterbetonbombe (SplBeB) Concrete fragmentation bomb Splitterbombe (SolB) Fragmentation bombs A/P (antipersonnel) bomb Splitterdichte Density of fragments (number of shell frauments per unit Solintergranate (SplGr) Fragmentation shell; greands Splittering Francentation sleeve fining over casing of the Stielband granate (lit Splitting ring) Splitter och ut abeille Pentective goggles splittersicher aplinterproof Spom Teail spade (G); spike (MG tripod) Sprachobi Mesaphone Spreiglafana Split trail spade carriage Sprengarbeit Blasting job Sprengbombe (SB; SprB) Sprengbombe, dickwandige HE bomb; demolition bomb HE bomb, thick-walled Spreng brandbombe (SpeBrB) HE-Inc bomb Sprengbiichee Depolition charge in a cohtainer petard Sprengbüchse 02/24 Demolition charge consisting of a box containing I kg TNT Sprengdieust (Sd) Desclition service spreages to binet Specagialle Sooby tran (See also Schreck ladung) Spreagfüllung Filler HE filling charge Spreagflüsnigkeit Explosive liquid Spenggulatine ; Spryngenmi Blasting gelatin Sprengernnete (Spres) HE abell HE abeli pattern 41, for a Sprenggrauete 41 (Sprat 41) tapered bore aua HE shell is a corridge; Sprenggrange-Patrone (SprgrPntr) (complete round of fixed summaition) Sprengeumm See Sprenggelatine Mine chamber (blasting) Sprengkamme Sprengkapael Detonator; blasting cap; initiator Detonator No. 8 (Aluminum) Sprengkappel Nr B.(Al) Sprangkapnelzinder (7.5, 10. 25 Sekunden) Detonating cord unit with blasting cap and fuse lighter prepared demolition act Sprenakap selapader 28 (kura) Prend demolitana aut with delay 100 sec Sprengkappel zuhder 28 (lanz) Prepd demolition set

Sprengkürper

Sprengkorper 28

Sprengkorper 88

with delay 200 sec

charee

picric scid

Demolition block; prepared

Demolition charge consisting

of a box containing 200 g

Demolition slab. 200 a

Sprengladeng (Sprelde) blassing charge Burstet tube (Proj) Sprengladungarobre Blest hole Soresgloch . . Liquid-air explosives oxyliquit Spreagiust Soresignizzel . Explosive in prepared form, as distinguished from generic term Sprengatoff; HE demolstron charge. HE charges and accessories Sprengmittelkunten Sarn Explosive ammunition Sprangamaition Trinitrotoluene (TNT) charge Sprengmunition 02 Spraugmunition 68 Piczie scid (PA ) cherge Emplouve givet Sprengalete

climates)

propellant

Explosion

ME bulk

See Splitter

Mine creses

Fune (lit Emplosive cord)

Tachnics of manufacture of explor

Explosive offect buesting effect

Injection south; steam injector

lajection molding die costing

Injuction molding composition

Demonsting fune: utimecord

aivest technics of demolitions

Type of emplosive

HE Siles (Amoo)

cems explosives

Description practice

to been breek; crack

Injection mold; jus mold

Range (of flamethrower)

Rinning vanhing flushing

Stick-type incendiary bomb

Bomb with long nobe spike

Stability (See also Bustandiskei

Chopped tube propellass

Speel; electric roil

Trace; track; trail

Traces projectile

Seit Schutzetaffeln

SS amored come

and Haltharkeit)

(See description)

Stick mine

Barbed wire

Echelon fire

Staff; rod; bar

Traces

ROWGE MURTING Spennspattone Zernthen Sprangucip star Spenngaets Sprengechlag Springschau Spreagunt

Sprengkomes

Sprengol

Sprengolpulver

Sprenguntiers Sprongwoff all was prospetati, Los Spreag me free oon

Sprong strick Sprougtocheik Sprengtrichens Sycanguag Sprongwickens Spranganidae springen Spritachine Sprittelome Spritzeres

Sprittguese Spritzweire Saule Spilens Spad (8); Leuchtsper (L'apur) Someteschess

SS-Pausantente Stübchenpulver (SchP) Senhillien

Stackelbombe (Stabe).

Stacholdrah Sculfel ferrer Descolition slab, 200 g in bake lite container (for monical Stablecuchous; Stablgrauste Fralesive force Sentuguas Bursting charge; demolition charge; Stablheim Seablhufte; Stahlwerl Stablicerageschous Stablinantel geschoss Stahlmbeses Stablpanzer Stahl seele Stahl apitzengé achous Stabl werke Stalag (Stammlager) Nizzoniveeno (NG): detonatiba oil - Samulinmer Sta NG peopellant; double base (NG-NC) Standors Blesting cartidge (demolitions); Stangenkuge explosive bullet Gun de etructor charge Stangenlading Blasting powder, black powder ... Mirrate explosive Bursting charge; explosive filler

Stengenladung Explosive; HE (See also Spream Släde a Startkat op ult Scartvore chrung Sentiv Subject of explosives;all that constauches!

Stanboulves (SchP) Stauchlaferre Staucho sobe Stanchavlinde

Separiagium steches stecken Szecker

Speckarinder 40 steil Sceilbaho Steilfener

Sceilfenergeschutz (Hasbitze). Howitzer (lit Righ-augle Seein Steinbruck Secialische

Steinkoble 4 Steinkohlespech Seeinge blooggewahr Scalimactes

Scallpine Scott er blån mil Stellschranbe

Sceel plute; sheet steel armor . Light case shell of cast steel

Case steel Steel belmet Steel work & Steel-core bullet; armo piercing bulles Szeel-jacketed bullet

Steel morter Steel armor Steel lines (G) Steel pointed bullet Steel foundry Princess of year comp for NCO's, privates and labor

derachmen Perent substance Post; garrison; station; position Pole; pose; pillar; ber; sod Counter shot: doublebeaded shot Pole charge (See general section)

Polu-charge natipersonne Staple; warehouse; pile; launching cradle Starch: struggeh; thickes. Catapuli Launchian device

Stand supports triped Finely granulated pawder to compress (by blow): Retractable (telescopie)

gun carringe Combression test crusber test Crusher cylinder

Steamic acid to stick; prick; plesce; to scick: stave remain Ping (Elec)

Inserted socket isniter nattern 40 High-angle trajectors High-angle fire; curved fire fire run)

Stone; rock Quarry Asbestos Mineral coal: autiencite Coal tar · Flistlock awa

Lock-put; regulating (adjusting) out Adjusting ting (Fx); time setting ring . See Stellstift

Sex ocrew; adjusting oc

Scellstiff; Stellschlüssel (St)

Seembandelpate Scongulves (Sch) Sternaignal Stewer Staverflügel Stewervak Stichprobe Stickwelfe Stickstoff (N) Stickatoffaaure; Stick stoff www.nermoffshare: Stickauoffwassecutoff-

Seletal. Stiplgrunnte (Stat) Stiglgragate 41 Stielbandereners (Sther)

Seife

ricimo es sec Stockming (Stobis)

Stoff -Sections Smiles Stolperdraht Stalperdrahtfeld Stolperdrahtmine Stopfbuchee Search

Storung efe ner Smandinglet StReed Stonempfindlichkelt

Smesses findlickeitsprobe 950 6560 Stonekappennine; Stonenin Scoustraft stoesreizber; stossemofindli atoes-sicket Stouwezanch Stocewanze Sconwelle

Stennständer Strahl Strablang Strandmine (5dMi) Strecke

orack on Streekstahl

Sent cluster cartridge (signal); multiple star cartidge Ster-shaped propellant Signal flate; star signal Control: steering wheel; tax Stabilizing fin (B). Steering Thrust; stab; sting

Sample taken at rendom Thrusting wempon . Nitrogen Hydrazdic acid: hydroniule acid; hydrogen trinitride (NN.) Boot; case; barrel Handle: shaft: stem: stalk Stick grenade; rodded bomb

37 mm Rodded bomb for A/T guo, Pak 41 Hand evenade with handle: otato-masher hand grenude Pin: pen: tack; stag Stick; cleaning and (Rf);

picken pole # A/P picket-type mine; stake mine (of concrete) Substance; stuff; fabric material Same on Chemis Gallery; tuopel Trin mire Field of trip wire obstacles

Trip wire mine Gland; stuffing box I inison nimiane disturbs troubles harass Harassing 5/10 (Arry) impulse: thrust shocks . . plos: push Bumper Pestin tummett tuppet (Fa)

Sensitivity to shock (Expi) Test for sensitiveness to shock to push thrust strike Contact mine (Nav) Percussive power, impact sensitive to shock insensitive to shock Shock test (Expl)

Ballistic pendulos Shock wave; percussion wave. Percussion fast Ray; jet (of liquid or gas); flash (of lightning) Radiation: radiance Beach mine; shore mine

Distance; space; stretch; drift (Mining) to stretch extent flatter roli (metal, giana) Rolled areel

to cross out; strike out; eliminare

Streichhole, Streich-

zündhal schen Stretten Streifenlader Streifemulyer (StrP)

Streit Strenglot Streubrondbombe streuza

Straufeuer, Streungsfeuer Strangarba Streukegel

Strongine

Streume . Strichfeuen bestreichendes Fauer Strobselletoff

Screen 9 Stromerneuger Stromliniengenchoss

Strommesser Stromstärke Strömune

Stücki Geschütz State Stoke (Storakenofflugueses) Stukaflieger Stumpf

etumpfer Winkel Sturm (Stu) Sturmertillerie (SepA) Stumgeschütz (SeuG) Sturngewehr 44 (StuG 44) Sturmkanone (StuK)

Sturmmörner (Stubira) Sturmpanzer (StuPz)

Stutement 45

Stramward.

Street. Sturnnagtiff Sturabomber Selena Sturaflame Stuckflug Storakampfflaggeng (Stake) Sciitze

Schragebraube (Sealer) Sensi (Sturzvinier)

(Friction) match Band, strip; stripe; beld

Magazine clip (Rf) Strip (band or lamellar) propellant Contest; combat; strife:

dispute Hard solder Scarterfire bomb to scatter sures: core with zone fire (Arty)

Zone fire (Arry); sweeping fire Cone of dispersion Sheaf of fire; cone of fire; cone of dispersion; cone of sprcad Uncontrolled mines stray mine (not laid to regular pattern)

Dispersion (Ball); scarcering deviction Grazine fire

Straw pulp Stream; current flow ciecpric current Generator (Elec)

Streamlined bullet been tailed bullet Ammeters existent meters Amperage Current; flowing; floods magnetic flux Pince (Arty); gun; cannon

Steps stage: dagree; rank Dive fighter bomber Dive fighter bomber pilot-Stupp Obtuse shile Assault: stom Assault artillery

Assault gun (SP G) Stormtrooper's nile (previously called Maschinespistole 44) Anniult cannon (SP) SP Assault moket projector (See under Panzer) Assault tank: front line aupoort

amored vehicle supplying over head fire power (See also under Pagger) Same as Brummbar (See under Panzer)

Storm wind Plunge; dive; fall Diving bitack Dive-bombing Lid: cover Reverberatory flame

Dive Dive bomber Support; stay; prop Support screw Dive Bombing night

Crucible cast steel; crucible Tiegelfluss stabl; Symbole acid; trialproresorcioni Sochanker Tienelaung-stahl Suspiges; Sometinis diren gan; mythana Trecarate Veterina Vocceinarias Heavy tank (See under Pear Sebetiture (See plan Eresta) Tigge 1 Sumpar ser in descriptive dett) Tiger II (Königetiger) Heavy tank (See ander Paszer in descriptive part) One of the tasks developed by T-18 (Passer) Tiger | üper Same as Inadtiger (See under Skodawerke (See under Pagger) Paster) Tabella Table: chan Tises (P) Heavy tank-descripter designed by Porache (Sea Tag-Tonne (TATO) Metric tone per day under Pearer) Tak Takastillesia Titerapparen Thrisipparen Titrating (volumetric) A/T smillery Tack: Techvege Tank sppazatue See Tellarmine A/T sitte. Triabbilehos T-Mine Tackgroben Tarageont Tarageont A/T ditch Killing concentration (CMS) rödliche Mess Tainittotoiuene (TNT) Camoulling oquipmen 4 . Tolin Camoudiage material Ton Tone; sound; clay Campallage TAIMME Almaine: arailineeoue certh Tonand Small stee one Mercic ton = 1000 kg oc.1-103 Tasche Posse (TO) Taxas Calipara key feeling antenna Diver (Nav) (See also Tomade Tayeber barrel: coak taucher). Sound treats TORWARDS technically pure operect nichaischreis Tenwindersahe Sound reproduction Techninche Mechille (Tune) Technical Emergency Corps Topi Pot; jar; crock; head erounds ensing Cool-our nitch Porshaped land mine Toursembak Topinine: To-Mie to divide graduate; share Teri Pest Tallbarmarker Philladens Increment charge; partial proper-Torficoble Peat charcos lant charge (St. Amms) (See alon Torbooki Powdered pear Veckamusche) Tomadabachusuvozieh Tomadoshweizprechien Tomadoshwerf Tomedo-launching devic Sectional belief Anti-tospedo gas See Teilkerranche Tomedo release (Ava) Tellmannel geneboan Some lacketed bullet Torpedo tube Torpedo anne spanske Samplerhated ballon paint builds Tallmantibulgenchess Tomedohootnerseit Destroyer (Nav) Tellmentelmire Sani-inchesed paimed (mirx) Topedoflieger Torpe do bomb gilos (Ava) Tomedo homber (Ara) Teilmer Gendanted ting Tempelaceachus Streamlined (bose-tailed) Tailechnibe Gendanted died: died-einker hallar Torpedogramme, Torpedosole Torpede shell Tellevick Genduction mech; mil (Arty) Torpedo-leunching tube Talufunken Gennes company manufacturing Torpedoschaelthor Motor torpedo boet electronic equipment Tomedo defense act Topodoschetzerti Teller Disks ages of a valves plan Turosdetssicher Deep-ses diver (See also Teller (Zinder) Time-scale (Fx) Taucherl A Tellermine (Tabl) Dish-type A/T mine Tomedoveri Tomedo releane (Ava) Topperstahl ' totpresses. Totachinge to dead press a . . Lennistes m'nat a buse Black)ack Tambieries Faxe time antring rings Tragmatgu rGum magacanti time scale (Fa) portable: productive tracher Tear See Technische Norbille trages Trages to bear, casty; support Tesching Small been side

Traglaster

Tranweite

treffee -

Treffpunkt

Ceiben

Treibean

Treibgei

Treibladone: Teri

Transmetoff (T-Swelf)

Donth (Mining)

Wenness)

Wispons)

Kasi Mortars)

Thermite

240 mm Railsted Gun (See u

740 me Railford Gen (See nade

Thermire (incendency) bomb

Deptit deepmene; dasp

Crucibles melting por

Depth charge ; depth bessel

Themite chirse (Inc B)

Henry SP mostar (See Ther and

Theodox Rrune (Kranne)

'Theodor (Kamed)

Themstadma

Themis

The

Tiete

Tiefon.

Tiegel

sheet toste, busy (Nury); drung Carrier; mount supports be Pack load Rauge Tour gas; Incrimetes Shipment-sale fano to hit; strike; meet; sake mehadrea

Treiban Floating mine; an enchored suro Derroma matic contact mine Uberwac bung Toribaired \* Propulsive agent Teciboulves Propellasti propellest powder Überwas ser stansfkenfte Treibapiegel Sabot diar U-Boot (Untersceboot) Treibupiegelgescho Sabot projectile (lit Di ac projectile) U-Boot-Bunker Treibetoff Propellant U-Boor Jager Engine fuel o U-Bootkries Trengangueren Separation process U-Boot-Mutterschiff U-Bootsets to step; trend; pass; nates U- Boot-Weefe Tretmine Trend mine: presente-ignited A/D Übung Trichter Funnel; center bone Übungsbombe Übungsgesch Termin picted with shell cracery Trichterfeld Tridhtnegelände Trichterindung Center charge Trichtermine Funnal mine Übungsgranere Trichterwirkung Mine effect /Whongsbandgranace Triableafe Motive power Übungaladınır Traibwesk Power plane Ubungamine Trilie Trinitrotolucae (TNT Übungamunicha Tripalarde, Trippe Tripoli Ubungepatrone trockes Übunganchissner Trockses Deige Lihe Trog Trough: wat Uhrwackannich Trommel Drum; cylinder of a revalues Uhrwerkzneder Tenmelfener Drum (ire: beavy barrage (Arry) Uhrzeiger Toomelmanair Drum (cylinder) magazine Teomaclesages is suffibree a Drun feed (im Gegegeneinn gum Toopen (Tp) Tropica Uhrzeiger) Tron fundiasche: Tron filasch Dropping bottle (im Siane des Uhrseigers) Tap frei chter Describe funnel Ethronio Tentyl Triniprotoluege (TNT) Trübungagrad Degree of surbidity T-Seoff

See Tringenstoff U and iii 🖰

Ultrageschoes bighly concentrated (80-85%) Ultrakurahelle hydrogen peroxide Umänderner Undrehengumbi @ practice: exercise: crais Umfang Perboric acid Pearbloric acid Perchromic acid Ексена развите; реклаше Unformer above I atm Transport (remsference) numb

ungenndert ungen beitet (uma) Dakeein nukriaral liniore unlaboriest Uniouf .

Ummantel una Umrandenmaschine Umrandung umrühren Umuchaiter Umschlassounke

Rotation: revolution: circu lation Jacken envelope; sheat Crimping machine Edir: border to stir, wir up Switch board: reverser COMMUTATOF Transition point unarmed Fireproofing not waterproof or gasproof; permeable: lenky; not tight

ference

recrystallized

equipped: outlined

inberochweren Masch trea mortaichéear 2 berschwefelail Überetrehlung Point of impact objective point (Arry) L'bertragen to driver propel; impal; drift

Propelling gas: wood you

Propelline charge: propolales

Vood-gith engine

charge

Überchloren

Überdreck

überbitzen

Bechieser

Troppen)

Überselpeter

Überführungszahl

Übernchienben (eigener

Übertragung." Übertragungskörper

Transmission Überungungsladung

POPREST WATER

Induced-demantion charge

(engine)

Superheater

Peraitric acid

to guperanturace

Overbend firing

Persulfutic acid

Overradiation; overexposure to transfer, transport, transmitt

communication charge

Superheavy machine gun

to superheat (steam); overheat

Intermediate charge; booster-

(to radiation)

nadichr

unbewaffner Unbrennbarmachun

carelop Converter (Elec) Modified: converted; reworked Perimeter radius circum-

всоре to embrace; comprise;

Conversion: change Number of revolutions; the Circumference; perimerer;

frequency wave (30 mc to 300 mc)

Clocktime (such se 13 45 es

Range drum (wight mount

Surface forces (Nev)

U-boat; submerine

Submarine pen

Submerine chaper

Submarine warfers

Submarine tender

Submarine ner

drill

policing

Surveillance: observation

Submarine construction yard

Practice; exercise; training;

Practice bombs dummy bomb

Training projectale; targer

practice projectile; drill

Practice hand grenade

Practice mine Practice appropriation

Practice carridge

Practice firing

Clockwork fuse

(Counterclockwise)

ments)

(Clockwise)

Practice charge (Ammo)

Watch; clock; timepiece

Ciockhaad; indicator (in

Clockwork action (Fs)

projectile . Practice shell

High speed bullet Ultrasbort wave: ultra-high

distinguished from Zeit, which means "time length"

-derchdein glich mandlich menshehelich manes indhar merlanbre Estferame un gefähr ungelöseheir Kall onacharf

descharf mechan Unitererat Unterbreches Unterchlorigament Unterchlorsaus Harantuck

Unterfeldwebei Unterfahrans Unterkaliberges Deteckish lung Unteroffizier Unterschied Unterprehoot nacorations. Untersuchons

Untermediane Unprempchanison Uncorwanesbouche Unterwagenhrücken zu Unterwasseherth paris Unterwessensben achimenson-les Unterwaneer conditions Unterwasserspensyma Unterwasserskoder Urasuoti Liveral-Review

V-1, V-2, and V-3

Vakumeöhre V-Boot; Verkehrbor Velocina-Null (Yo) Ventil-Vestildičkom ventileest Me versites. variadestick rerankerer Ma Versechmag Voranegel Verboad' 177

Verbandsahwert Verbandswert varbacant (u)

impermeable; impeastrable infinite: endluss iadi menashle inert (Amno) Absence without leave (AWOL) Verbindungsatück showt; approximate Verbot Ouick line

unarmed (Falcout of focus Verbranch seas: (Optics) to disers (Ameo) Interne; young physician vechrenabe

Hypochlorous scid Hypochloric scid Diminished pressure;

vacuum; below atmosphere pressure. Scuff sergment Understage (E.R.) Subcaliber projectile

Difference See U-Boot m bulgaort Investigation; exact Inmertina

MCO; corporal

Sold surgoom (Cary and Asry) Depth charge; depth bomb Underweter bridge primer Hydrophene (Nev) Understand about artmar

Underween split primer Underween blancing (Don) Underwesse actions or fune Original model: promytype Primary matter Jungle westers

See Vargelinggewelft

Launch

Vent; valve

Valve gasker

Monred mine

Laren

Sleeve-type engine

obsolete: antiquated

Ashings incineración

Binding; bandage; dressing;

Formation release (bombine)

bond: combined arms unit

variable; changeable;

Board of scalalege sceni

used in Gurman aunioniver

laitial velocity: muzzle velocity

Perdua sten Verein; Vereinigung Vereinbeitlichma Versioung Verfahres Variati Verfelechme

Variations' verfertigen verleuere verflächtigen Verflüchtigungsfilhigkeit verflüssigen to and the

Variaguag des Oberhammenden der Heeres Vergälung

recgüren Vergaser

Verfürung

Verbesserung

Verbladues

Verbirenanne

Verbrennungenzalyse

Verbreamang et sum

Verbrennungekraftmanchise

Yerhrennes erückerand

Verbressmanneitme

Verbundieschoss (V)

(See also Beneza)

verdeckte Zündung

Verdick ungewictel

transferance.

Venlichtungenpparat

Ventichrongsmeanervelle Ventichrongsmeile

Verbreitaungewurt

rerchiore

Compound; union; joining; examply; alloy (metal): liainon Advances

Correction (Guanv):

improvement

Prohibition; off-limite declaration

Consumption per 100 kilometers (ghe and (ubricants)

combumible Combustion: burning defiagration Analysis by combustion

Internal combustion enries Combustion chambers propellent chamber;

ponder chember Regidues of ignition (or combantion) Heat of combustion

Calorific power; combi value . Compound projectile

(See Imarrigenchess) to chiorinare Chromium placed Tamping; and Copping (Denk demning up (a stream) to evaporace; vaporize Heat of reportantine

(or evaporation) Covered priming Condenser Compression wave; burst wave; detreation wave Thickening agent; thickense to thin; diluce (liquida);recely (400000)

> to eveporate Union: association: sociary Standardization Formation of ice: Icina (Ava.) Estacificacion Method; procedure; process Decay; deterioration; decline Adulteration: falsification: (OLESTY to refine; improve to make; perpare; manufe

to fire; launch; burn up W Vaporine: Sysporate Volatilir so liquify; dilute

Disposal; discontino Army Regulation

Dengraring to femerat Gauifiet; co Vergelesna Vergeltoneswaffe(V)

vergiessbe vergiften Versiftungearhlange Verglasses Vereleichsec

Vacarpasema voteriton

Ve/giituagaetahi Verhälmin Verhirtung Verharsen: Vecharma

Verholsung Verholsung Verjängnes verkanten Verbelesh

verkehm Verketting Verkittee s

Verkleidune

Verkiolacress verkleispers

verklemmer verknällen verkaletera Verkalsterone verkebaltes verkoches verkobles verkoken verkreiden verkühlen verkupiteta verkuppela verkliczne Leuchtopu (vk L'apur) verk drates Röhengadvut

Yerlag: Verlagebachhandlung Publishing house verlascen

verlanzere Artlileria verlantetes Geschütz verlöschen verlöten! vermengen; vermischen · vermennen

Vermessungsba verminderer Ladwag

Vermögen Veraebeluus decelchtung.

Retaliation; reprinal; revenge Retaliation (revenge) waspon such as V-1, V-2 and V-3) enstable; ready to cast to power: contaminate (1.WS) Gas shell fire (Arty)

Vitrification; glazing Calibration fire (Arry); test shooting Enlargement

to improve; remper (metals); COMPCONST Heat-treated occel

Proportion; ratio; rare Hardening Residification Lignification Smelting; working off (merals)

. Taper: reduction (of acale) er cant; tilt; incline See V-Boot ceverne; inverse Linking: linkage Fastening (scaling) with purry of other adhesives

cementing Facing: coping: lining: disguise; casoullage Diminution: enduction

to make into paster to cover with glass so stick cogether. to jam | wedge to detonate to decrepitate Desferitation to place with cohele

to boil down: concentrat to char; estbonize co coke so calcife so cool down to copper to couple: to coopert Shortened traces trail

> Tubular propellant cut into shore lengths to pack or load on vehicles or hornes Pack arrillers

Pack piece (of ordnance) to go out; be extinguished . to solder to mix; blend Ranging bestery

Reduced chates to mine; lay mines Ability: power: property Smoke ocreénina

Destruction; sanihilation

vernieten Verordaues Verpackung Verpackungsgeschoss

vernickelo

to aickel-plate

Packing; casing

Defineration test

Misfire: failure

Acidification

camouflage

to platiaize

action -

EMBEY

Dummy projectile for

Order; decree; regulation

vehicle-loading practice

Performance; execution;

to expand; fade; discharge

Diversion (ire; smoke-shell

Closing; closure; breechblock;

Breech screw; duraded cloning

to mask; screen; veil;

breech mechanian

shorter alide!

cap in fune

to apray (CTS)

Reinforcement

Test charge (Acty)

Test firing (Ord)

to defend: maintain

to distribute: divide

Deepening depressions

Distributing foint

to render impores

Application: use

Defense weapon

Caperimental.

Renearch

cavity ,

to dry up

COOTEMIASTO

Screw-type brenchblock

Wedge-type breechblock Breech ring; closing hing

Breech locking elide;

Screw joint: screw can

Prescription; order; note

Disappearing fun mounting

to provide; supply; fuculab to silver-plate

to brace; tighten; street

Acteration; case bardente

Experiment; assay; wail;

to pufi off; deflagrate; explode

to riner

verplatinieren verpuffen Verpuffungaprobe Verrichtung

rettostet Versager Versäwerung verschiensen verachleiere

Verachleisennestense

Verachlus a Po-Verachluseblock Verschlusskeil Verschlusering Verachlungerhieber

Verschluss-schraube

Verschraubung Verschreibung Verschwindlafere vernebed versilbern VECUDADADA versprühen Verstählung Veretärkone Versuch: Versuchung

Versuchladung veraucha Vetauchachinanes Verauchweesen verteidisen Verteidigungawatie verreilea Verceilunguarelle Vertiefung

vertrockses verunreinigen

Verzahoune

Verzeichnie

verzinken

servicifachen; vervielfältigen to multiply Verwenden Verwitterung

uriliancion Efflorescence; weathering Genry genring List; register; lades to coat with since

salvanias verzinaes to tin; cont with tin veradgera Veradgerang (V)

to de lay; postpone : Retardation; delay; fag



Verzögerungskörper Verzögerungssatz Verzögerungssatz

Verzigerungezünde

Vernug Verzugsneit (Vx) Verzugsneidung (VZ) Verzweigung Vieleck vielfach; Vielfache Vielfach; Vielfache Vielfachwerfer (Rahuton) Vielrohegeochutz,

Vinceck Viertune Viertune Vierting Viertings-blanchinengewehr Viertaktmoter vinieren

V-Hull (Vo); Velecime-Null Vegeidung Vulkustungsvels Eine

Volkswagen (VV)
Volkskas Volksparkelen

Vellgeschoss

Valication
Valicate
vollationity
vollationity
vollationity
vollationity
Vonderland
Vonderland

Vandruck Vandruck

Vochale Vockates Vockartesche

Vociednag Vociego (Voci)

Ybeland vacuals Vacprobe Vacrichous Delay element
Delay-action mine
Delay pellet in an electric
igniter; delay powder main
(Fz) .

Delay fune; delayed-action fune Delay; Ing Safety time (in faming) Safety funing Branching

Multiple rocket leasther

Multiple barrel gue;

Square: questrangle

Four-loosed stand

Four-berreled MG

Four-cycle engine

to gage; sim; nigh

Siehr mechanism

laitist velocity:

muzzle velocity

disch defence

by Poteche)

(1.435 merers)

projectile

Salld ties

Discore his

Mark

orest.

Musule loader

Lood (fising)

part) Vald; wedding

Courses recall

Preliminary rest

marken) ...

teet; copy; pattern;

comething put in from

Contrivuoce: Jevices

Bird abot; small abot

People's rifle in last

People's caridoniesed

Shor; solld son-explosive

Monohlock gun berrei

Complete sound of

Ideastle and of hears

Process: chemical

reaction; occurrence

First impression; proof;

Compar receil mechanism

Front increment propelling charge (SL, Ammo) (See

Flash reducing wed (Arty);

under Cordine Charge

Casings in descriptive

Standard-page RR

Polygon

manifold

Multiple

Gattling gun

Four-tuber

Vorwiener Vorzundung Vulkanfiber

Wacht

Vocaignal

Vorstacker

Varanha

Vocatore

Vorreighakeaft

Wange; Wage Wachengiment (Wa) Wache

Wachtmeister (See pice Feldwebel) Walfen Waffenamt Walfenamt Walfenamt

Vationpritung Vationpritung spiers

Walton und Gerite
Wagen
wilgen
Wilgenchele
Wilgenchale
Waltonder Walt neuer

Valigrahea Valor

Valmennihle Välminger Valmwerk Vand

Taraniager Viene Viene behandlung Viene behandlung Viene behandling Viene bilden Viene bilden Viene bilden

Wismaglei chwert Wismekraftiebre; Wismekraftiebre; Wismekraftiebreik Wismekraftiebreik Varning nignal; preliminary signal Sefery pin (B. Mi and Ge);

Safety pin (B. Mi and Ge) lug (Fn) Director; nuperintendent Adapter; attack; advance Propelling power Preheates Preignition; premature ignition (Mos) Vulcaniand fiber

Scales; balance Guard regiment

Gused; watch; onder station (Avn) Spaff orgenat (Arty and Cavy) Veapone; sor Office). Ordinance office (liz Veapone office). Ordinance deput Ordinance deput Ordinance office Or

Wagon; cue; whicle to weigh; balance Weighing pipet Weighing dish Probability income Fuller's neath (See also Waschenda) Rampart; dam; ambantures

Oreinance material

emantment
Mont; dirch
Roller; roll; sylinder;
body (of a shall);
drun (of a revolver)
Raller mill
Bull or roller bearing
Ralling mill

Interior wall; partition; builthend Warehouse Heat; warmnous Thermal expension Heat treatment

Thermal expension Heat treatment Resistant to bene Heat balance Absorption of heat Thermo-electricity Mechanical equivalent

of beat Themodynamics

Thermal conductivity Conduction of beat. Wänneprobe
Wänneibertragung (W)
Wänneibertragung (W)
Wänneibertragung (W)
Watne
Watneibertragung (W)
Watneibertrag

Wasser (Vabo)
Wasserdoupfbal
Wasserdoupfbal
wasserdicht; wasserfest
wasserdicht; Wasserfest
Wasserhehn
Wasserkunst

Wannerhinie
Wannermantel
Wannermintel
Wannerphitrog
Wannerwhienaprobe
Wannerwhienaprobe
Wannerwhienaprobe
Wannerwhienaproby
Wannerwhienapr

Vecheelgewiebe; Gewiebe

WESSAMESS weaveries. Vehr Vehre Webstieger Vehrmacht Volumes believe (VH) Vehrmacht-Luftwaffe (VL) Vehenscht-Marine (VM) Veicheisen Veichlot: Veisslot Weichstahl Veinconia Voingeist Veinsiure: Veinsteinsiis Verankanan

Veisolot Veitochusspauso Veitveilat

Welibleck Welle Weltenbuck Weltkring Wendepunkt weefen, Wenfer (W)

Verfergraams (Vige) (See also Wurigename) Verfermannen

Veelt Vezg Vesk Heat test . Werkstatt
Thermoregulator . Wetkstoff
Heat canacity
Werksteing

Lug; srud; nipple; knob to wash; scrub Fuller's earth (See also Walkerde) Water Depth bomb; depth charge

Depth bomb; depth charge Steam bath waterproof; water-tight hygroscopic Water tap; water cock Water-work; draining engine (Minine); hydraulica

(Mining); Hydraulics
Waterjacket
Hydraulic moorae
Water testing; water analysis
Onderwater fizing test
Hydrogen (H)
Hydrogen pyroxide (See also TScoff)
Hydrogen ios concentration (pH)

Hydrogen ion concentration (pH)
Absorbent coston; wadding
Change; displacement (Arty);
exchange; cusvency
Transmission (motor vehicle a)

(See also Kradibleragma) to such away; reject by suction to throw away; reject Delensay parapet Military service Armed Forces, Amy Armed Faces, Amy Armed Faces, Amy Amed Faces, Amy Amed Faces, Amy Amed Faces, Amy Salisa (Wh) Amed Faces, Nary Instable Soft molder

sochi
sofi (mild) preel
soci
sieri visegar
sieri visegar
spirita of visegar
teleteleteleteleterm
Term
This cone (Ger making for
lacation)

o Long-range cartridge
Long-range flame thrower (See
also Flamesumer(re)
Corregated sheet iron
Wave shad; farie; frequency (Rad)
Wave band; frequency band (Rad)
World War 1 (WW)
Teming point; citized point
so throw; flam

Launcher for socket or algual projectile; morter (lit Thrower) -Morter shall; rocket

Frame-type rocket projector Shippard; wharf; dock Tow; oakum Wod; works; plant; factory Verkstoff Verkstoff Verkstog Verkstogsstroné (VZ<sub>W</sub>atz)

Verkveugstahl Vesen Vespe

#estwali

Vester

Vertendynamit

Vetterskunde

vetternicher

Vettersprengmittel; Westersprengssoffe

Vetrateiq Vichte

vaider Videratand Videratandans

Winde

Widerstandmenner Widerstandmentrum

Widerstons; Viederstons wieder Wiege Wiegen Wimpel windabwarts; Isewarta

Windflügel Windflügelnicherung Windsenser Windschutzschnibe Windscreichholzer

Vindstrom Windsung windwärts Winkel Winkelgruppe Winkelmeuner

Winkelspiegel

Vinterkrieg . Vinterlost

York shop Material (industrial) Tool; instrument Sceel precious round used by armorers for tenting the function of weapons (lie Instrument cartridge) Tool seed Being; nature; character Vasp: SP Howitzer (See under Panzer in descriptive part) West Wall (Fortifications along Germany's western frontier) Veather; storm; firedamp (Mining) Permissible dynamics: dynamite safe to use with firedamo Meteorology (Met) safe in the presence of firedamp Permissible evolutions safery mining explosives; explosives safe to use in fiery coal mines Whatecone: hope Unit of weight: macific gravity senings contrary to Resistance Ohmmeter Center of registerers center of deap Countershock againt snow

Cradie (6) to weight tock
Pennent
downwind
Windlass; winch; worn
(acrew) (...
Arming range (8)
Arming range stop
Wind ganger, nemomete
Wind ganger, nemomete

Arming wane stop
Yind gauget amemometer
Vioduhield
Scorm marches for ligheing a fune (lit Wind strike
marches)
Blust current in current
Twist (Ord)
windward; upwind

wandward; upwind Angle; V-formation corner Firing ungles Contometer; gunner's quadrant; protractor Pariscops; protectoscope (Tr.) Flagman; signaler using

a nigaal disk; signal arm or light indicating direction of turn waters

50/50 mixture of Levisite and mustard gas (CVS)

Ventichoung

Yneric

Zabi

Zahnarai

Zabarod

Zange

Zeofes

Zan Baha

Zeichen

Zelger

Zeit

Zeichewes

Zeithoube

Zeltmesees

Zeitechaus

Zeitucheift

Zaltzindung

Zaitzünder (ZtZ); (ZZdr)

Zementcylindrincho Be

Zentrierwalst (Compare with

Zeiswa

Zalle

22454

7 elles

Zellamif

2-11-1-4

Zellulose

Zellwożle

Zementieren

Zemene Kalk

Zehentstahi

Zontrulblass

Fahrungsbandl

Zer. Zerim

zerbrechen

**Berdrückes** 

aerfalles

andlianes

Zancrifunninic horum

7.eemer

(2C8)

Zasime Casim

Zehaling (Zehale)

Y-Robe Y-Röber

Zacke; Zacken

Zaha; Zahigkait

7

Vertex; eddy; spigot; drum soll Wishel Fair current whishood Wirhelatton Cyclone; tornado Wirbelature Whirlwind 20 mm SP four Wirbelwied barreled AA gual (See also under Pagger in descriptive DAR) with some School-water Effective range Action; effect; efficiency Dickson Field of fire; sphere of action; Wirkung absended effective mase Wirkungsgrad; Hutselfakt Efficiency Viper; spenger windshield wiper "Winches Classics rod (G) Winchmark Visual; Visuath: Visuant Bismuth (Bi) Tungates; unlines (W) Wolfren Tyagaten nickel-steel Wai fram Niche i Sanh Tungaten ateel Wolframetah Cloud: wave of gas (CWS) Waike. Wool J Walte Boat-type rusper placed sade: Walek wecht gue whorks for operation in deep seew Linetic spersy; striking power; Warht force of impact Pad; padding; mil; uniergement. Shoulder; swell (on projectile) . Walnt (ma Gearbeen) Throw; cast bomb release Beach trajectory Surfighe: Surfigerabel Cube; pailer; die; capsule Wartelpalver (WP) Cabical (or prismetic) powder or propullant; dice-shaped propuliant Wurfannit (achweren Verisignals, etc (Chemical rocket posit) (See also Nobel woofet) projector) Missile, projectile Wirtesschoon Wurigrance ( War) (See also Mortus shell; socket Verletgranets) weiectile Wafgranezunder (WZ) Marries shall fane Special projectile for almal Wartenand piscole: mekat pariectile Wurfladenz (Wirfldz) Reduced propeiling charge Wasterland Trench-morter shell ... or bomb Vuchfeil Darr serve Framework-type projector for Variations HE or incendiary sockers Mortar range; throwing range **Variveite** for head greenders; bombing Firgebohrung Tapered hore; choke barrel (Ord); (See also bosisches Rohr) Vicasla was ROTARY DWG Crimping pliers (for caps) Vingezange Pargens. Crimo (Ammo) X-Strakles X-Rays (See also Rossgenstrahlen! Xylol Xyivae

lóustaed gas; ypatits Y-tube Proper tooth; notch Toughness; tenneity; v iscosity Number numeral Destint Gear wheal; pinipa toothed wheel Gent Dame Pliere tongs Pegs ping plugs word; Drain coch: tee Conium Teertsher Sign unck; signal Denwing blueprint drawing Pointer indicator hand needle Time (leagth); period (See also Liberait) Time bomb Chronometer Time funct nafety been: Bickford fune; blanking fuse Periodical: ioweak ---Newspaper paper news Time luse (Amme) Delayed ignition Call: cellule See under Vamlants im descriptive part Callulose acetete Paper pulp; cellulons Collulaid Celiulose " Callulose fiber Concrete cylindrical bomb Cementation Hydraulic lime Comentation steel Hundredwei der 50 kg Central journal or paper Bourrelet (lit Canterine bead) Centrifugal safety (Fx) Continue to break in pieces: shatter; crack so enside ensemble to disintegrate to deliunence: melt

to reduce to small pieces Zonenzeit Zeckleiserung maachine Crusher pulveriser Zuhehile Zedaniletosa Blast; concussion Zucker zecknistecn to decrepitate Zuckerie zerlegen to decompose; disassemble; Zufluss dismentie Zuführer Zerlegernader, Zerlegunge Self-destroying fuze (AA Ammo) Dispersal: self-destruction; Zerlegung Zug (pl Züce) aniquina nermables; zerreibes to grash; grind fine: triturate: Zurabe Dulverine Zughrücke' Berri Pees to tear Incernte: break Zecschoeidenhoder Zuzdruckzünder See Zug- und Zerschneidernunder Zeroktamag Zugfeder Decomposition: disintegration Zugiestiskeit; Zugspannung Petrpalten to split up: cleave Zuekraft; Zugleistung persplitters to split up; shatter; dissipate (forces etc.) Zurmeschine Zpetan PECAPORAGES. to crack; burst into pieces; Zug- und Druckwinde. 29 (ZDZ 2it) blew up perspringers to stanlade: hurse serstanben Zerstanberdin to reduce to dust; stomize; spray . Zug- und Zerschneide-Spray cozzle; Diesel fuel injector anoder 35 (ZuZZ 35) Zerstänbegaröt Chemical spray apparatus Zeratores . Destroyer (Nav); long-range Zuzverkehr fighter (Avu) Zeretämettee Zugverauch Gun destruction charge Zerotäreng Zerotörengensbeiten Zugwagen Destruction; descrition Zugwünder Demolitions Zugunder 35 (ZZ 85) Zerstörungsbombe Zerstörungsfeuer Demolition bomb Puma ches Destruction fire Zumischpalver Zeretreyang Dispersion: diffusion: scartering Zerreilung Division; separation . Zhaischmoff Zertrenous Separation Zündseines Zettel Card: ticket: tag Zindapparat v Zeus Ordnance suppliers gear; equipment stuff; material; fireworks composition Ordenter Department Sündbez Note: Zougant was in charge of weapons, assumption, military Zindbolsen vehicles and dething Zänddraht Azaenal; armory Zoughaus zünden " Zennie Certificate: transcript of grades (School) aichbar ductile aichen. to draw; pull Zünder (ZA) Ziehen: Ziehman Drawing Ziehzlindet Pull firing device (LdM)-Zunder (elektrische) Ziel Goal; target; objective; aim Zünderdeckel Zieleistichtung Sighting mechanism Zündereinstellung nielen to nin; night Zünc-rfullmanne; Zündneta Zielfererob Telescopic wight mechanism (Rf) Zielgerit; Zielverrichtung Sighting mechanism; bomb night Zündergeböuse Zielmanition Subcaliber ammunition; target practice ammunition Zündergernt, tragbar Zielpunkt Target point aiming point Zielpupe Target dummy Zünder, genicherter Zielacheibe Practice target Zielachwärze Bull's-eve · Zunderhalter Ziller .. Figure: number: ciphes Zünderhälne Ziffeeblarz Dial (on instruments) Zünderk sope Žink Ziac ' HC militure (Za dust 40 and . Zinkaebe hexachlomethese 60%); Berger mixture Zinade ek ösp es Ziofel Tip; point; end; lobe ; ear Zinderlaufzeit Zell Inch (2.54 cas); daty; earlift; coll

Fuze body (Sh); fuze cover (B); fuze bousing Portable demolition equipment Fuze set at safety (See also Zuader, acharfer) Demonstor bolder Hood of a fuze, fuze cover Closing cap (TiFa); bead (PD Fa); upper chp (Clockwork Fa)

Standard time

Sugar

Saccharia

Accessories, fittings

Elow; flux; resources

(automatic weapons);

Trasa; rifling aroove:

Spoplement: addition

Tractive force; traction

Prime moved tractor

Pull and bush ignited

29; (lit Pull and pres-

ours innited (Little)

Puil and tension wire

cut up igniter) (LdM)

Pull igniter 35 (Lidse)

Admixed powder dos

Admired materials admires

paraming apparentingmagner

expludes blassing marking

Percussion plunger (TiFa)

to ignite: detonate: fire

Tinden forge scale

to act the fune)

Electrical ignices

False pgive (Proi)

Fuse setting

a demolition charge; take

lander (Little); fune (Sh)

Fuse filling fuse compo-

Railroad traffic

Tennile test

Pull igniter

To shut: close

(in dynamices)

lenition system

iaffammable

Princing wire

ignition apparetus;

Tractor

ignicer 35: (lir Pull and

Pull-pressure ignites (Ldbi)

pulling; draft platoon

belt feed (MG)

Drawberdee

Deaw spring

Tow tope

Tensile stredeth

Feeder; feed mechanism

Body of a fune Time of functioning of a fune

Zindkanel Primer vent (Cart); axial flash hole (Fu); cap hole (BlCart); vent hale (obturneer) Zinakupod Zindkegel Anvil (in primer cop) Zindtesse Spack plus Zündkinscha Ignition pullet Zindladene (Zelde: Zele) Booster charge; gaine; ignition tube Zindaduna, A. B. C/98. See under Sonatur la descriptive C/95No: 36 and 40 Ziedladung bin, 4 Ignition tube used in macke genemters and smoke greandes Zindladwankeres Detentor casing (Falt primer equesions; primer charge bossing

Flammable metal (such as Mg.

Fuses and accessories, types A.B.C.

Percassion needle; firing pin (Fa)

Ignition curtidge; percussion tube

Pellet of a deconsting compusition

Vent changel to transmit fire

Powder train (Ammo or Dem); ig-

Safety fuse; lanyard; match cord

Safety fuse lighter or igniter, type

Detonating fuse: primacord:

atter train (Pyro): fuze composition

Needle am (invested in 1836 by

Igniter and tues materials

Al at Zr)

N. von Drerne)

Princeg powder

Initial innula-

29A, 29B, 29C

Flash point

Ignition paper

in a cap

Zindloch
Zin

zindapparst) Zindanose Zindanotali

Zindmirreikapten Sacs A,B,C Zindmodel Zindmodel Zindpapier Zindpapier Zindpatrone Zindpatrone

Zandpulver Zindpunke Zindpunke Zindrohehon Zindrohehon Zindrohe

Zündschaut (Zdscha) (Sae also Zeitschaut) Zändschautunder 29A; 29B, 29C Zündschaut, detonierend Zündschnuseitzunde
Zündschraube
hly 43
AA gra)
Zundschrauben Futte
me fase
(lit
Zindstaft
Zindscoff

Ger 307

Zündetrahi
Zündübertragung
Zündung (Zdg)
Zündungstemperatur

Zündverstlicker
Zündverstlicker
Zündverstlicker
Zündverstlicker
Zündverstlicker
Zündverstlicker

zunehmender Rruli Zuneigung Zunge Zurrbolzen Zurrbolzen

Zindviras

Zurückgleiten Zurückstrasung Zurammenfasung

Ensemmengeineutes Feuer

Zusamerewse

Zusummenziesung Zusatz (Zus)

Zusatzkartusche Zusatzkaden r

Zuentmeittel

Zuentzemittell Zuentzemit

Zustand Zustellung Zustellung

arrit Access; admit
Access; admit
adminsion
twachs Increase; incr

Time fuse igniner
Threaded partnassion '
primer (for propelline)
Bushing of a threaded
percussion primer
Case of a threaded percussion primer
Firing piss
Flammphle material;

igniting agent
Plank in su igniter or
primer
Induced deconation (Dem)
Firing: deconation (Amno
Firing: deconation (Amno
nad Dem); ignition
Temperature of ignition
Resinforcing igniter (See
in descriptive section)
Relay (Fa)
Distributor (Mex)
Priming arrangements;
intellige arrangements;
intellige medicals; medicals; meachanism

Flammable goods
Heat of junition
increasing review, progressive rithing
Inclination; ettachment
Tonguer, pointent; needle
(of a balance)
Locking pin (6)
Locking mechanism

(C or MO); neisings nachinge Rectil Reputator; praking back Summary; reaumi; concentration (Any); Concentrated fire (Ary); collective live (SA) Composition; synthesis; chemical compound Collision; encounter,

clash
Synchronization; coordination; working together
Contraction; whitsking Addition; admixture; appendix; extremion
Awailiary transmission; auxiliary driver auxiliary driver
Additional (secondary) propellent charge; and menting charge (Mot);
menting charge (Mot);

Addition agent; rengent
Admixed material; material
for admixing
Addition; merenne; extra
charge; admixture
State; condition; situation
Delivery

Access; admittance; adminsion Increase; increment; growth

increment (in St. Ammo)

sweinchnie · binnist . sweifingig. hinocular Zweibein Bipod (MG) Zweideckez Bipleas Zweielektrodeuröhre Diode tube (Rad) Zweigleitung; Zweiglinie Branch line (RR): junction line Zweinetall Binetal aweimotorie twin-engine Zwei-Ohe-Verfahres Binaural method (sound location) zweiphosi e ewo-phase; biphase Zweipoleöbe See Zweielektrodenrohm Zweirad' Bicycle Zweitakene Two-cycle engine zweiwertig hivalent: divalent Cutting pliers; piacers Zwicksanne Zwilling (Zw) Twin; two-tuber Zwillingsgegetell: Zwillings-Twin mount (Ord) lafette

Twin barrels (such as in MG)

Twin-berreled MG

Abbraviations
(American and British)
Used in the Preceding Vocabulary and in the List of
German Abbraviations which Follows

AA Anziaircraft; AAG Antiaircraft gun; AC Aircraft

Zwillingsläufe

Zwillingsmanchinengewehr

A/C Anticoncrate; A/D Antidisturbance; Am Ammonium Amos Amounition: As Airplane: AP Amor-piercias: A/P Antipersonnel; A/T Antitank; Avn Aviation; & Bombt Bull Ballistics: SC Ballistic cap; BD Fa Bear detonation fuze: BI Blasting: C Cap or capped Cartridge: Cavy Cavalry. conta containing: CP Concrete-piercing: Cryst Crystal or crestalline: CWA Chemical Warfare Agent; CWS Chemical Variete Service; OA Direct action DEGDN Diethylenesiven dinitrate; Dam Demolition; E-Bost Enemy boat (British designation for Germa PT-Boat); Elec Electrical; Engr Emineers; East Emplosive(s): Pln Amme Fixed ammunition; Pln G Fixed gun; Port Fortification: Fx Fuge: G Gun; Gor German; Gove Government; GP General purpose; GP-HE General purpose-high explosive; Gr Grenade; Guny Guanery; H or How Howitzer, HdGe Hand grounder HE High explosive: HEAT High-explosive, antitank: HoC Hollow charge; shaped charge; imp impact; inc incendiary; inc & incendiary bomb; inc-T Incendiary Tracer, loty Infancry, he kilocycle; he kilograms km kilometer, L. A. Lead Azide: LD Long delay: & dhi Land mine; let liverally; L. St. Lead acyphaste; Muth Mathematical; Mc Megacycle; Mach Mechanical; Met Meteorological; M F Mercuric fulminate; MG Machine gun; Mi Mine (Inad or underwater); Mk Mark; Mer Mortar; Met Motor; Mount Mounting; N Nose; Nev Naval; NC Nitrocellulose; NCO Noncomissioned " officer, MG Nitroglycerin, MGe Nitroglycol; MGs Nitroguenidines Ord Ordnance: PD Fx Point-detrinating fuse: PETN Pentserythritol Tetranitrate; Pist Pistol; pl plural, Proj Projectile: Pyre Pyrotechnical: OF Quick firms: Rad Radio: Rf Rifle; Rock Rocket; RR Railrond; Railway; SA Small arms; SA Amore Small arms amountains: SAP Semi-amor-payreings Set Sergeage Sh Shell: Shr Shrabnel: S L Amma Separate-loaded

ammunition; SP Self-propelled; SP G Self-propelled gun; SP How

Technical; Tolog Telegraph; TiFz Time fuze; Tr or T Tracer;

Self-propelled howitzer; T or Tk Tank; Td Torpedo; Tech-

True Trajectory, We Wespon Wr Weight

Zwillings-MG-Drehrum Revolving currer with twinbarreled MG Zwillingssalz Double sair Zwillingswatte Twin-berreled weapon Zwinze Cramp; clamp; vice Zwinger Vedge Zwire Thread (lines) Zwimband Tape Zwimiedenbung Binding thread swinches between; among Zwischenbodengs schoss Large caliber shell provided merde with a solid partition Zwiechenlage lotermediate laver Zwiechenproduke Intermediate product Zwischenstück Adapter Zwischenstufe intermediate stage Zwischenzeit Time interval Zwischenmerend Intermediate-state Zvanwasserscoffnaure Hydrocyanie acid: prossie scid (CWS) Zvlinderoulver (Zvlo) Cylindrical Propellant Zylinderverschlung , Bott mechanism (Rf)

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# LIST OF GERMAN ABBREYIATIONS (Abbürzungen) OF ORDNANCE AND RELATED TERMS

| A Abw                                               | Abwebr                                  | Defense                                                          |
|-----------------------------------------------------|-----------------------------------------|------------------------------------------------------------------|
| A; An                                               | Artillezie                              | Artillery                                                        |
| A(when following project<br>tile designation; white | Austonaladung                           | Expelling charge of a shapned or smoke projectile                |
| stancilling)                                        | HANG to a B and C                       | Types of bollow charges                                          |
| A(such se in: HI/A, HI/B,<br>HI/C)                  | Hohlindung A, B, and C                  |                                                                  |
|                                                     | Aggregat Eine                           | Aggregate No 1                                                   |
| Note: A-2 was the first norc                        | essful liquid-propellent socket develop | ped at the Rocket Development Center at Eummaradorf Vant         |
| A-4                                                 | Aggregat Viet                           | Aggregate No 4                                                   |
| Note: 4-4, commonly known                           |                                         | l liquis-propellent rockets (See V-2 in the description section) |
| sA; AA                                              | alte Azt                                | 'of old type or petters (See also aA sad aF)                     |
| AB ,                                                | Abwuribehälter                          | Aerial bomb container                                            |
| Examples: AB 23 SD2; AB 2                           |                                         | 3 500-3A, etc [TM 9-3965-2(1953), pp 95-108 and 11-119]          |
| AB (black stracilling on                            | Ausemanbuchen (Kanonengranate rot       | Smoke canister ejected from projectile on burst (Gun shall)      |
| a projectile, such as EGr                           | AB)                                     | with red smoke conister)                                         |
| rot AB)                                             |                                         |                                                                  |
| Able . ,                                            | Abküraung .                             | Abbreviation                                                     |
| Abors Abr 1                                         | Abpreller                               | Ricochet; sicochet burst                                         |
| Abe                                                 | Abrustung                               | Demobilization; disarment                                        |
| Aba >                                               | Absender                                | Sender                                                           |
| toods                                               | saloeda                                 | absolute                                                         |
| Alvoch Ger                                          | Abschusagems                            | Grenade Isuncher                                                 |
| ABSc                                                | Artillerie-Boobach rungsetelle          | Artillery Observation post                                       |
| Abe: Abela                                          | Abseilung                               | Sections detechment, department                                  |
| Abw                                                 | Abwehr                                  | Defeace                                                          |
| Aba ***                                             | Abang                                   | Trigger: petreet                                                 |
| 46                                                  | eam currents                            | of the current year                                              |
| ACB (such as in                                     |                                         | Marking on a plastic PDFs in 80 am smoke morter shell            |
| WGR AT ACB)                                         | (Verfgranntenzünder Trolital ACB)       | [TM 9-1985-3(1953), p 591]                                       |
| e/d´                                                | aa der *                                | on the; at the                                                   |
| •D                                                  | auser Dicast                            | Pretired                                                         |
| MD                                                  | auf dem Dienerwege                      | Through official sources; through channels                       |
| AD                                                  | Azmeedolch                              | Army degree                                                      |
| Adi                                                 | Adjutant                                | Adjutant                                                         |
| Adm                                                 | Admiral                                 | Admiral                                                          |
| ADO                                                 | Allgemeine Dienstordnung                | General Service Regulations .                                    |
| Adr                                                 | Adresse                                 | Address                                                          |
| Ae; Ä                                               | Aether: Ather                           | Ether                                                            |
| AEG                                                 | See under Wasplasts (descriptive sec    |                                                                  |
| self: No                                            | seussere (aussere) Veite                | Outside diameter                                                 |
| Aff                                                 | Artillerieflieges                       |                                                                  |
| A G                                                 | Atomgewicht                             | Artillery air observer; Artillery spotting flier                 |
| A · G                                               | Aktiengessellschaft                     | Atomic weight                                                    |
| AGFA; Agfa                                          |                                         | Joint Stock Company; Open Corporation                            |
| AGa .                                               | A -G für Anslinfarbenfabrikation        | Aniline Dye Manufacturing Comporation                            |
| AHA                                                 | Vuscpienssencponn                       | Sighting projectile                                              |
| AHO ·                                               | Allgemeines Heerenamt                   | General Army Office                                              |
| AK .                                                | Amerhanpiquarties                       | Army Hendquarters .                                              |
| AL.                                                 | Armenisorps                             | Army Corps                                                       |
| Alt                                                 | aktiv                                   | active; on duty                                                  |
|                                                     | Aluminium                               | Aluminum ,                                                       |
| Al (black strucilling follow-                       | Alminiumgriess                          | Designation of an HE shell containing some granular Al           |
| ing the designation of shell                        |                                         | flash producer                                                   |
| 7.5 cm GebGr (5 Al)                                 |                                         |                                                                  |

| ALF          | San made World                                |                                                    |
|--------------|-----------------------------------------------|----------------------------------------------------|
| Alle         | See under Varplants, etc (description Alkohol |                                                    |
| Am           | America; amerikanisch                         | Alcohol; ethyl alcohol; ethanol                    |
| Am           | Ammonsalpeter                                 | America; American (See also VStA)                  |
| AmmonStrP    | Ammonstreifenpulver                           | Ammonium nitrate                                   |
| =/M          | an Main                                       | Am aitrate strip propellant                        |
|              | an dem                                        | on the Main (river)                                |
| AML          | Armer-Munitionals ger                         | at; by; to; on; near to                            |
| Amp\$s       | Ampere stunde                                 | Army Ammunition Depot                              |
| and          | andich                                        | Ampere-hour                                        |
| An           | Anisol                                        | official                                           |
| Au 60/40     | Anisol 60/40                                  | Trinitronnusole (TNAns)                            |
| Anf          | Aniang                                        | TNAns 60 and Am nitrate 40%                        |
| AufGeschw    | Antangegeschwindigheit                        | Beginning *                                        |
| Angew Chem   | Angewandte Chemie (formerly Zeit-             | Initial velocity; muzzle velocity                  |
|              | real entire Chemis (tomerly Zell.             | Applied Chemistry (Journal)                        |
| - Aub        | acheift für Angelenader Chemie)               |                                                    |
| Anh          | Anhanger                                      | . Appendix; supplement                             |
| AnbW         |                                               | Trailer; supporter; follower                       |
| Aal          | Anhungswagen                                  | Trailor                                            |
| Asso Anwerk  | Anlago                                        | Plant; catablishment by                            |
| Ann          | Annerkung                                     | Remark; footnote                                   |
| Ann          | Annahme                                       | Acceptance; receipt                                |
|              | Annales des Chemie                            | Annals of Chemistry (Journal)                      |
| ANR          | Anpassung                                     | Adaptation                                         |
|              | Armee Nachricksen Regiment                    | Army Signal Regiment                               |
| anch         | anschiensen .                                 | to hit by shooting                                 |
| Ansch Patr   | Anschiesspacrone                              | Ammo used for adjustment fire                      |
| Anat         | Ansahi                                        | Establishment; institution                         |
| Aas          |                                               | Number                                             |
| Ans          | Anzeigez                                      | Indicator; informer                                |
| ANZ          | Anzünder                                      | Ignites                                            |
| ANZ-29       | Anzünder 29                                   | Friction pull type igniter used to ignite > or     |
| ***          |                                               | set off a mocke candle (TN 9-1985-2, pp 284        |
| AO           | Artillerieoffizies                            | Artillery officer                                  |
| An 3         | Ago                                           | Designation of airplanes quantid by Ago Co.        |
| AP           | Artilleriepunkt                               | Artillery reference point(Guenety)                 |
| Арр          | Appares                                       | Apparatus; device; equipment                       |
| AR           | Artillezieregiment -                          | Artillery regiment                                 |
| An AR        | Arado *                                       | Designation of airplanes manufid by Arado C        |
| ARDR         | Menning unknown to us                         | Designation of a snoke signal flare (TM 9-1<br>84) |
| A/R          | om Rhein                                      | on the Rhine (river)                               |
| Ade          | Arktikmunition                                | Anno for use in Arctic climate                     |
| Azas ~       | Armee                                         | Army (formation above Army Corps)                  |
| (ACM)        | acmiest .                                     | Armed                                              |
| , Areg As e  | Arsenal                                       | Araenal                                            |
| Are          | - Azzenik * .                                 | Amenic (As)                                        |
| Art; Artl; A | Artillerie .                                  | Artillety                                          |
| Art SchPl    | Artillerie schie unplaza                      | Artillery firing range; Proving ground             |
| AS ,         | ' Anforderungunigani                          | Call signal                                        |
| Alle         | Answertescelle *                              | Computing station (sound and flesh ranging         |
| At; Atm      | Atmosphäre                                    | Atmosphere                                         |
| Att          | Attuché                                       | Attaché                                            |
| Arte         | Attrape                                       | Dummy                                              |
| Aci          | Atmosphärenüberdruck                          | Gage pressure; pressure above atmospheric          |
| Aubo         | Auspenhordentor                               | Outboard motor                                     |
| Auf          | Aufbeu                                        | Building up; construction; organisation            |
| AuG.         | Auflace                                       | Edition                                            |
| Awfa         | Aufachae                                      | Photographic picture                               |
|              | Australi                                      | Impact (gunosry)                                   |
| Auch         | Ausbeute                                      | Yield                                              |
| Ausb         | Aunbildung                                    | Training                                           |
| Amelic       | Ausbennung                                    | Erosion (of a barrel)                              |
| Aust         | Ausführung                                    | Execution; completion; model; design               |
| Aver         | Anegabe                                       | Insur; isomence                                    |
| Amer         | Averieung                                     | Arms and equipment                                 |
|              |                                               |                                                    |

Beilage

|                                                                           | Get 311                                                                                                               |                                                                                                                                                                            |    |
|---------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
|                                                                           |                                                                                                                       |                                                                                                                                                                            |    |
|                                                                           | automatisches Gewehr                                                                                                  | Automatic rifle                                                                                                                                                            |    |
| autom Gere                                                                | See under Varplants, etc (descriptive :                                                                               |                                                                                                                                                                            |    |
| AVA                                                                       | Vpaspinaties authorities are (manufactor)                                                                             | Defense smoke shall moster                                                                                                                                                 |    |
| YA.                                                                       | and Zeit                                                                                                              | Temporary                                                                                                                                                                  |    |
| «Z                                                                        | Azetvizahi                                                                                                            | 'Acetyl number .                                                                                                                                                           |    |
| AZ .                                                                      | Aufschlagzunder                                                                                                       | Percussion (uze; PDFz                                                                                                                                                      |    |
| AZ; Az                                                                    | AZ fur Haubengranace                                                                                                  | PDFz for shells with ballistic cap                                                                                                                                         |    |
| AZI Hbgs                                                                  | AZ für Hausengranace                                                                                                  | PDFs for light mores shell                                                                                                                                                 |    |
| AZRIVA P                                                                  | AZ für mittlere Exercicemine, Rauch                                                                                   | PDF 2 for medium practice mine, with smoke                                                                                                                                 |    |
| AZImExMR 9                                                                | Aufschlagzunder 39, Klappensicherung                                                                                  |                                                                                                                                                                            |    |
| AZ 39K                                                                    |                                                                                                                       | Capped percussion fuse                                                                                                                                                     |    |
| AZaK                                                                      | AZ mit Kappe AZ mit Verzögerung                                                                                       | Delay action percussion fuze                                                                                                                                               |    |
| AZeV                                                                      | AZ ale Versogeroug                                                                                                    | Delay PDFn for cannon shell with asserted head                                                                                                                             |    |
| AZmVfKGmP                                                                 | mir Pannerkoof                                                                                                        | Dates brus not company april arranged meno.                                                                                                                                |    |
| AZaV                                                                      | AZ obne Verzogerung                                                                                                   | Nondelay percussion fuse                                                                                                                                                   |    |
| AZ 269 eV mSt8(f)                                                         | Aufschlagzunder ohne Verzögerung                                                                                      | French impact (use without delay with tappet (hammer)                                                                                                                      | •  |
| VS 363 8A #240(1)                                                         | mit Storee) (franzonisch)                                                                                             | Marie interest arriver name, and orbits (amount)                                                                                                                           |    |
|                                                                           | Aufschlagrunder 36, Stahl                                                                                             | Steel PD fuse, pattern 38                                                                                                                                                  | ٠  |
| AZ 38 St                                                                  | Aufechiagrander and Brennsunder                                                                                       | Time and percussion fune (TPFx) (lit Impact and                                                                                                                            | •  |
| AZuBZ                                                                     | Valecularizations and the surrament                                                                                   | burning fuze)                                                                                                                                                              |    |
|                                                                           | AZ 23 ungelindert mit zwei Verzögerun                                                                                 |                                                                                                                                                                            |    |
| AZ 23 yang                                                                | VS 13 trefermote itt tagt satt sattofferm                                                                             | , , , , , , , , , , , , , , , , , , , ,                                                                                                                                    |    |
| AZ 23v (0.15)                                                             | AZ 23 manintanho mis 0 15 Salemdon                                                                                    | PDF a 23, simplified, with 0.15 seconds delay                                                                                                                              |    |
| ACC #14 (0.23)                                                            | Vernineman                                                                                                            |                                                                                                                                                                            |    |
| AZ 23 Za "                                                                | AZ 23 vereinfacht mit 0.15 Sekunden<br>Verzogerung<br>Aufschlegnunder 23, Zink                                        | Zine PD (une, pattern 23                                                                                                                                                   |    |
|                                                                           |                                                                                                                       | * 1                                                                                                                                                                        |    |
|                                                                           | В .                                                                                                                   |                                                                                                                                                                            |    |
|                                                                           | 1                                                                                                                     |                                                                                                                                                                            |    |
| B) Beti Betts                                                             | Barterie                                                                                                              | Battery                                                                                                                                                                    | ٠  |
| ъ .                                                                       | ' Bau                                                                                                                 | Construction                                                                                                                                                               |    |
| (ъ)                                                                       | belgisch '                                                                                                            | Belgian (Marking on equipment)                                                                                                                                             |    |
| в '                                                                       | Boutel                                                                                                                | Bag; pouch                                                                                                                                                                 | 5- |
| р .                                                                       | Bombe                                                                                                                 | Bomb                                                                                                                                                                       |    |
| B; Bu                                                                     | Buckee.                                                                                                               | Jack; bushing; socket (Rad)                                                                                                                                                |    |
| . Bj B#                                                                   | Býchoz                                                                                                                | Rifle; canister; abot gun; tin can                                                                                                                                         |    |
| BIE, BIEZA and BIEZS                                                      | Bombe 1E, etc                                                                                                         | Types of 1 kg Inc bombs (TM 9-1985-2, p 48)                                                                                                                                |    |
| B1:3E, B1.9EZA and                                                        | Bombe 1,3E, etc                                                                                                       | Types of 1.3 kg inc hombo (TM 9-1985-2, p 49)                                                                                                                              |    |
| D1.5EZB                                                                   |                                                                                                                       |                                                                                                                                                                            |    |
| BZEZ and BZ.ZEZ                                                           | Bombe 25Z, etc                                                                                                        | Types of 2 kg and 3.2 kg Inc bombs (TM 9-1985-2, p 49)                                                                                                                     |    |
| BA                                                                        | Banent,                                                                                                               | Building and construction office                                                                                                                                           |    |
| Baj'                                                                      | Ba josett*                                                                                                            | Bayonet                                                                                                                                                                    |    |
| BAK, Ball AK                                                              | Ballon Abwele Kanone                                                                                                  | AA guo (lit Ballono defense gun)                                                                                                                                           |    |
| Ball '                                                                    | Ballistik                                                                                                             | Ballistics                                                                                                                                                                 |    |
| Ball ,                                                                    | Ballon                                                                                                                | Balloos                                                                                                                                                                    |    |
| Bacus Back                                                                | Betaillon                                                                                                             | Bartalion                                                                                                                                                                  |    |
| BASF                                                                      | basisch                                                                                                               | basic                                                                                                                                                                      |    |
| B-B (such as SC 250-8)                                                    | See under Wasplanes (Descriptive secti                                                                                |                                                                                                                                                                            |    |
| D-D (80CH 68 SC 230-B)                                                    | B-Bombe (Spierogcylindrische 250)                                                                                     | HE cylindrical banb of three-piece construction; nose-                                                                                                                     | •  |
|                                                                           |                                                                                                                       | cast steel, body-tube steel and base-arched case steel                                                                                                                     | -  |
| Bb; Beob                                                                  | Beobachrungsbarrerie                                                                                                  | (TM 9-1985-2, p 8)<br>Observation battery                                                                                                                                  |    |
| BD                                                                        | Blesinas                                                                                                              | Lead wire; decoppering wire or full                                                                                                                                        |    |
| Bd ·                                                                      | Bodes                                                                                                                 | Base; bettom                                                                                                                                                               |    |
| Bd                                                                        | Brand                                                                                                                 | Firet incendiary                                                                                                                                                           |    |
| BDC "                                                                     | D:BBG                                                                                                                 | Designation of a cluster-bomb container (TM9-1985-2,                                                                                                                       |    |
| 550                                                                       | 1                                                                                                                     | by 93-5)                                                                                                                                                                   |    |
| BdG; Bd Geech                                                             | Brandgeschoes                                                                                                         | Incendiary projectile                                                                                                                                                      |    |
| BdGga                                                                     | Brandgranate                                                                                                          |                                                                                                                                                                            |    |
|                                                                           |                                                                                                                       | Incendiary shell Base detonating fuze (BDFz)                                                                                                                               |    |
| 847.                                                                      |                                                                                                                       |                                                                                                                                                                            |    |
| BdZd 3.7 cm Pres                                                          | Bodenzunder                                                                                                           | DDF-1-(17 4D -t-f)                                                                                                                                                         |    |
| BdZ<br>BdZd 3.7 cm Page<br>BE                                             | Bodenzünder'det 3.7 cm Panzergranate                                                                                  | PDF z of 37 mm AP shell                                                                                                                                                    |    |
| BdZd 3.7 cm Pzgr<br>BE                                                    | Bodenzinder'der 3.7 cm Panzergranate<br>Besondere Einflüsse                                                           | PDFz of 37 mm AP shell<br>Special factors (Ball)                                                                                                                           |    |
| BdZd 3.7 cm Pagr<br>BE<br>Bej Bet                                         | Bodenzunder der 3.7 cm Pannergranate<br>Besondere Einflüsse<br>Beton                                                  | PDFz of 37 mm AP shell<br>Special factors (Ball)<br>Concrete                                                                                                               |    |
| BdZd 3.7 cm Page<br>BE<br>Be; Bet<br>Fefa                                 | Bodenzunder der 3.7 cm Pannergrannte<br>Besondere Einflünne<br>Beton<br>Befehlahaber                                  | PDFx of 37 mm AP shell<br>Special factors (Ball)<br>Concrete<br>Commanding officer                                                                                         |    |
| BdZd 3.7 cm Pzgr<br>BE<br>Be; Bet<br>Fefn<br>BeGr; Betgr                  | Bodenzünder'der 3.7 cm Panzergranste<br>Besondere Einflünne<br>Beton<br>Befehlahaber<br>Becongranste                  | PDFs of 37 mm AP shell<br>Special factors (Ball)<br>Concrete<br>Commanding officer<br>Concrete-piercing shell (See also GrBe)                                              |    |
| BdZd 3.7 cm Pzgr<br>BE<br>Bej Bet<br>Fefh<br>BeGr; Betgr<br>beh; behelfsm | Bodenzunder der 3.7 cm Pannergrannte<br>Besondere Einflüsse<br>Beton<br>Befohlnisber<br>Betongrannte<br>behalfmannsig | PDF :: 0 37 mm AP shell<br>Special factors (Ball)<br>Concrete<br>Commanding officer<br>Concrete-pieceing shell (See also Gribe)<br>emergancy; hasty; improvised; makeshift |    |
| BdZd 3.7 cm Pzgr<br>BE<br>Be; Bet<br>Fefn<br>BeGr; Betgr                  | Bodenzünder'der 3.7 cm Panzergranste<br>Besondere Einflünne<br>Beton<br>Befehlahaber<br>Becongranste                  | PDFs of 37 mm AP shell<br>Special factors (Ball)<br>Concrete<br>Commanding officer<br>Concrete-piercing shell (See also GrBe)                                              |    |

Annex; enclosure; appendix Ballde Beiladung increment charge; booster charge baim Baiw bei dem Beiwagen er;near; about; with Bai Bai Belagerung Siege Belestune Load; charge; burden . Ber Berichte (der Deuts Reports of the German Chemical Society (Title of Gesellechaft) journal). Called now "Chemische Berichte" beritten ber; Mounted Bedin Berlin Beri Garrisôn; crew Ses Beestaube Beachiessung Besch Firing: shelling: bombe bospages borse-drives beep Bet Sec Be Beg Bear Betriebs operational Sele BeGr and GrBe Betfer Betge Bett; Bet Berrang Base (fixed gun); foundation (gun empiadement); platform (RR gun) Bett Gesch Bettungsgeschütz Ourrigger base gun (AA); gun on platform mounting Boutelkett (auch as is Bestelkanusche Propellent charge in a bag French 10.5 cm shell) Bewaffnung Arms Bez; Bz Berziek : District beziehusesweise respectively; on and/or beau; bau Br BM Bahabat RR station Commending officer (CO) Befehlshabe Bth **BGeech** Beobachtunggeschoss Projectile used for adjustment fire Baw Bergwerk BhrGeoch See Bo; BoGesch Bolypswoos Demolition custridge; blasting cartridge BhsPerr, BohsPet BhiPatr 68 Bobrpatrose 68 Demolition carridge 1888 (containing pictic scid). Demolition cartridge 1902 (contg 75 g of TNT) BhuPatr 02 Bohrpatrone 02 Demolition cartridge 1928 (costs 100 g of TNT) ShaPatr 28 Bohmatrone 28 BMSkL. Behelfsmockellafette Auxiliary pedestal mount Bi (auch as SC 50 Bi) HE cylindrical bomb inving a one piece case steel (Sprengrylindrinehe 50 Bh(Bombe) body mechined down (TM 9-1985-2, p6) Blendkomer 1 Francible amote granade; glass, smoke granade, SK L pattern 1 Botdkanose Aircraft or shipboard cannon Marking on a container with 25 modified red flares BK (such as Mr. 250 BK) (Mark 25 BK) and three SD 2 bombs (TM 9-1985-2, p 108) Bordinferre Gun mount on ship or similane used in conjunction with Deut to indicate bine color B1 (black or white, Blaz stencilling) of amobs Blue cross (Ger marking on sternutarors)(CWS) Blankrens BL BIL Bleigfombe Lead seal of protective cap (fuzz) BI (white suggesting)
BLC (such as 50 kg BLC) Amo with mert charge Blindseladen: Blindseschoss Photofinsh cylindrical bomb, 50 kg (TM 9-1985-2, p 81) Blitzlichteylindrische (Bombe) in leaflets of flakes blatterffemig See under Warplance (descriptive section)
Blattchespulver Pro BLM Propellant in the form of square flakes (Used in so BIP howitzers) Armes blanches (bayoner and other cutting weapons) BlWaff blanke Watten BHT. See under Warplazes (descriptive section) Bosmomethylethyl ketone (test gas) (stable) Brommethyl athylk eton Bo-Smitt APHE projectile (HE charge exploded after the arm Bot BoGesch Bobrgeschosn or concrete was pierced Forged steel shell with cavity filled with HE Bo: BoPr (black stencilling) Boltgeschous, Press-stablform (ausgebohrte Press-surhigranate) Bo (I inch lettering midway indicates a rotating band of the bimetal type, itom covered with copper (TM 9-1985-3; p 349) between the rotating bend and shoulder) Ventral gus mount Bodeslafette Light came shell of cast steel (TM 9-1985-3, p 349) Bobrgeschoss, Stablgranete Bo Stg (black stencilling) Fixed round with a smoke producing projectile used B Petr Beobachungsgeschoss Patrone for idjustment fire Fire; incendiary

|                                | Get 313                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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|                                |                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Br (such as                    | Brandbombe                                       | Incendiary bomb (TM 9-1985-2, p 55)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Br C 250 A)                    | El-mathocard.                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Br (white steerilling)         | Brandgranate                                     | Inconding shell .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| BR .                           | See Busts                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| BrG; BrGesch                   | Brandseerhoss                                    | Inconditivy bullet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Baga; BrGe                     | Brandgranate                                     | Incenduary shell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Brgr as L. sput                | Brandgranate mit Leuchtspur                      | Incendiary shell with tracer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Brgr o L'aput                  | Brandgranate ohne Leuchtspur                     | Incendiary shell without traces                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| BrK                            | Brang Kesone                                     | Railroad gus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Bridg                          | Brandisdung                                      | Incendiary charge (in a projectile or a house)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Relies                         | Bronze Morset                                    | Brooke morter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| BaNK .                         | Brono N Kasons.                                  | Bruno resirond gue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Brozen                         | Brandpanzergranate                               | Armos piercing incendency projectile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| BrSetz                         | Brandesta                                        | Incendiary composition in a projectile or bomb                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| BrSchrGdPatr                   | Brandschespaell Grans: Payose                    | Incendency shrapnel shell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| BrSpart Brapar                 | Brandsprenggrasse                                | High-explosive-incendiary projectile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| BrSprgrPatr [. 'spur as Zatl'. |                                                  | HE-incendiary-traces, self-destroying fixed roand of same:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| (such in 15 mm 140-151)        | Zerlegung                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| BrZ; BZ; Ba                    | Breasunder                                       | Time fuzz (lit Butning fuze)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Ba                             | Beechuse. '                                      | Firing: abouting                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| BaPair 7                       | Beschüsspätröne                                  | Proof tolaid (high persuare round)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| BSB (such as BSB-360, BSB      |                                                  | Various types of incendiary bomb costainers [See in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 700 and BSB-1000)              | *                                                | TM 9-1985-2 (1953), pp 110-11]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| BSE (such as BSE-56)           |                                                  | Rectangulas, aluminum bomb containes [See in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                                |                                                  | TM 9-1983-2 p (8)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| BSe .                          | Beobachtungsuteile                               | Observation post                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| BSdMi                          | B-Stehnine                                       | .Concented stick mine (TM 9-1985-2, p 276)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| B-Stoff                        | Bromaseton -                                     | Bromacerone (tear gan) (metable) (CWS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| BSV                            | See under Vamilanta (descriptive section         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| BT ·                           | Bombentorpedo                                    | Torpedo bomb                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| BtaK '                         | Bootskanne                                       | Roat assault gan                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Su<br>Du                       | See B; Bu<br>Buotreach                           | Colored smoke                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 82                             | Bicker                                           | Designation of simulanes manufe by Bücker Co                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Be .                           | See B: B a                                       | The state of the s |
| Bull (Belg)                    | Bulletia de la Societé Chimique de               | Bulletin of the Belgian Chemical Society (Journal)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                | Beigique                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Ball (F2)                      | Bulletin de la Societé Chimique de               | Bulletin of the French Chemical Society (Journal)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1                              | France                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Busts BR (Mock mencilling      |                                                  | Filling in a projectile giving on burst a cloud of vari-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                                |                                                  | colored smoke (See also Bunkreusmunition)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| BV                             | Beautiverband                                    | Association of manufacturers of bearens                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| BZ; Bx; BxZ ·                  | Breanzonder                                      | Time fuxe (lit Burning fuxe)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| BZ-24 BZ-39                    | Brennzinder 24; Brennzinder 39                   | Friction, pull type igniters used in hand granudes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                |                                                  | (Th 3-1985-2, pp 283-4)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Da .                           | Beasol                                           | Benzene .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| BZA .                          | Bombeunielspoacat :                              | Bomb sight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| B2E                            | Bresamunder E                                    | Friction, pull type igniter used in "egg" type greeneds                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| •                              |                                                  | (TM 9-1985-2, p 284)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 82G                            | Bombenzielgernt                                  | Bomb night                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| bagi .                         | bezüglich                                        | referring to; in reference to '                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Bass                           | Bearin                                           | Gasoline                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| baw .                          | See beaw -                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                |                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                | ·-C                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| C (such as C/1, C/2            | Consended of the bar                             | Matel and the fall of the state of the Material State of the State of  |
| C/12 etc)                      | Construktion (obsolete spelling of Construktion) | Model; type; make (when placed after designation of<br>a gun, shell, fuze, etc)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| C. (such as                    | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| SC 1000-C "Hermana")           | (Sprengcylindrische 1000 C)                      | Marking on a 1000 kg HE cylindrical bomb (See in<br>TM 9-1985-2, pg 9-10)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| C; CZ; ChZır Ca                | See ChZtr circs (sires)                          | shoug; approximately                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| C-Gesch                        | C-Geschous                                       | Streamlised projectile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| CN                             | Chioroform                                       | Chloroform                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Cha -                          | Chemia                                           | Chemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Ch-mZ: cMZ                     | Chemisch-nechanischer Zünder                     | Chemical-mechanical ignites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| ChZtr: CZ: C                   | Chemisches Zentralblass                          | German journal similar to Chemical Abstracts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| CAZ 41                         | Chemisch-mechanischer Zünder 41                  | Chemical-mechanical appe ignites, passeen 41                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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|    | CMZ-11V                     | Chemisch-mechanischer Zünder 41W                | Chemical-mechanical igniter for delayed action demo-<br>lition (TM 9-1985-2, p 313)                |
|----|-----------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------|
| ,  | CPVA .                      | See under Warplants, etc (descriptive :         | section)                                                                                           |
|    | Cu (white stancilling)      | Kupfer .                                        | Copper driving band                                                                                |
|    | C-Zug                       | Zugmaschine für achwerete Artillerie            | Prime mover for heavy artillery                                                                    |
|    | * 1                         |                                                 | · ·                                                                                                |
|    |                             | > 10 m                                          | A S S S S S S S S S S S S S S S S S S S                                                            |
|    | D: Def                      | Daupfer                                         | Steemer                                                                                            |
|    | D. Opt                      | Danestener                                      |                                                                                                    |
|    | an.                         | deutach .                                       | Continuous fire                                                                                    |
|    | D ,                         | Dichte 5                                        | German (marking on equipment)                                                                      |
|    | n                           | See Digl                                        | Specific gravity; density                                                                          |
|    | D: Dm                       | Durchmeaser                                     | Diameter                                                                                           |
|    | D (in fuze designation      | , one man and                                   | Rocket nose fuze under BC, (See in TM 9-1985-3, p 585)                                             |
|    | Hbgt Z 55D)                 | (Haubengrangstennlinder 35D)                    | Norwer some ters meret DC, (See 15 IN 5-1503-3, \$ 385)                                            |
|    | D (in igniter dealgoation,  | Druck                                           | Pressure type igniter (TM 9-1985-2, pp 295-6                                                       |
|    | DZ 33)                      | (Druck sunder 35)                               | a resource obbe demies (150 h 150 h 150 h                                                          |
|    | DA (in fuze designations,   | Direkte Aktion (Direkte Aktion                  | Designates a direct action fuze, such as DA Impact Page                                            |
|    | sucis on D&AZ)              | Aufschlagzüsder)                                | (TM 9-1985-3, pp 552, 553, 556, 561)                                                               |
|    | DA-G -                      | Dynamit Aktiongesellschaft                      | Dynamite Joint Stock Co                                                                            |
|    | (dia)                       | dänisch                                         | Danish (marking on equipment)                                                                      |
|    | Dep                         | Dapolia .                                       | Trademark of motor fuel                                                                            |
|    | DB; DF                      | Dreibein; Dreifusa                              | Triped                                                                                             |
|    | DD-Gesch DdGeach            | Dundungeschoss                                  | Dundum bullet                                                                                      |
|    | Dep                         | Deparche                                        | Telegram                                                                                           |
|    | Deut (Geoch); Dr            | Deutgeschoss                                    | Projectile giving on burst a cloud of colored smoke serving                                        |
|    |                             |                                                 | sa indicator                                                                                       |
|    | Deut (Patz)                 |                                                 | Indicator cartridge, such as for greated pisted                                                    |
|    | DF. >                       | See DB                                          |                                                                                                    |
|    | DPS                         | See under Varplants (descriptive secti          | on)                                                                                                |
|    | Di                          |                                                 | Diatrobessess (DNB)                                                                                |
|    | Digi                        | Diglykolnitret                                  | Diethyleneglycoldinitrate (DEGDN)                                                                  |
|    | Digl; DigIP; D              | Diglykolpulves                                  | Double-base propellant DEGDN-NC, stabilized with centralite,                                       |
|    |                             |                                                 | with K salfate added to reduce flash.                                                              |
|    | Digl BIP                    | Diglykol Biknehenpulver                         | DEGDN-NC (tiouble base) square fisks propellant                                                    |
|    | DigiP                       | See Digl                                        |                                                                                                    |
| ,  | DIMPY                       | Diglykolpalver, v erbesserr                     | DEGDN-NC, improved propellant                                                                      |
|    | Digi RGP                    | Digiykol Ringpulver                             | DEGDN-NC (double-base) propellant(a circular disc with a                                           |
| •  |                             | Diglykol Röhrespulver                           | central hole) DEGDN-NC (double bang) tubular propellum:                                            |
|    | Dial RP<br>Dial SmP         | Diglykol Screifespulver                         | DEGDN-NC (double base) strip propellant                                                            |
|    | DIN SHIP                    | Deutsche Industrie Normen                       | General industrial standards                                                                       |
|    | DL.                         | Doppellatette                                   | Two-barreled mount                                                                                 |
| ,  | DLH                         | Deutsche Lufthaum                               | Designation of a German commercial air line                                                        |
|    | DM : Adamsit                | Diphenyl minchlorarain                          | Adamsite (CWS)                                                                                     |
| ,  | Do .                        | Doming                                          | Designation of simplenes manufe by Dornier Co                                                      |
|    | DO (such as in              | Potmer                                          | Marking on 150 mm smoke shell morter 36                                                            |
|    |                             | 15 cm DO Geret 38                               | , seeming on 150 mm emone emericance                                                               |
|    | DOP [such as in             |                                                 | Marking on a DEGDN propellant used in mortar ammo .                                                |
|    | DOP 15 Wu (Digit)           | •                                               | (Recognition Handbook for German Ammunition Sup Hqs .                                              |
|    | 500 15 00 00 00             |                                                 | AEF, April 1945, p 201)                                                                            |
| -  | DopZ; DoppZ; DZ             | Doppelzunder                                    | Combination fuzz; time and percussion fuzz (TPFa)                                                  |
|    | Dopp Z mK                   | Doppelunder mit Klappen sicherung               | TPFa with folding safety device                                                                    |
|    | Dopp Z aF                   | Dopp el sunder neue: Fertigung                  | TPFz, new construction                                                                             |
|    | Dopp Z S/60                 | Doppelzünder, Sekunden 60                       | TPFz, 60 seconds burning time                                                                      |
|    | Dopp Z 5/60 F1              | Doppelzünder Sekunden 60, Fliekraft-            | TPFz, 60 seconds burning time, centrifugally operated                                              |
| ٠. |                             | antrieb                                         |                                                                                                    |
|    | Dopp Z S/60 Geb             | Doppelzündez, Sekunden 60, Gebirgu-<br>geschien | TPFz 60, seconds for securitain gwa                                                                |
|    |                             |                                                 | TPFs, 60 seconds, heavy                                                                            |
|    | DoppZ 5/60s                 | Dopp elaunder, Sekunden 60, achwere             | Marking on a base-detonating fure used in 150 mm rocket                                            |
|    | DOV (in fuse designation    | (n. lil I - pour                                | Marking on a pase-detonating rupe upon in 150 and rocker.                                          |
|    | such as BdZ DOV)            | (Bodenzinder DOV),                              | projectile (TM 9-1985-3, p 622)                                                                    |
|    | DOV (in booster designation |                                                 | Marking on the PETN booster, pattern 98 used in 150 mm amoke<br>rocket 41 (15 cm Wurfgrunate 41Nb) |
|    | DOV Zdlg C/98Np             | DOY Zündladung, Construction 98,                | LOCKER AV (1) CM AMERICAN ASSAULT                                                                  |
|    |                             | Nîpolit)                                        |                                                                                                    |
|    |                             | P                                               |                                                                                                    |
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| NC 50 D/See (50 | O kg Nebelcylindrische Bombe D/See)<br>e Digl StP<br>e Deut (Gesch)<br>mies                                                                      | 9-1983-2, p39)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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                                              | e Digi StP<br>e Dest (Gesch)                                                                                                                     | 9-1985-7, p 19)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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| nation 14 35 ENZ 3/40) (Na                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | ack 35 ENZ 3/49)                                                                                                                                 | (TM 9-1985-3, p 568)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                           |     | Per Formape "                          | Fernancecher                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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FE                               | Feldrinenbaha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Light narrow gage RR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

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Fernkampfartitlesie
                                                                   Long-range amiliary
Feks
                            See FA
Felda
                            Zeldertillerte serät
                                                                   Field attiliery equipm
PeldsG
                                                                   Military policeman; militar;
Felde: Feldgen
                            Feldgendern; Feldgendarmerie
                           See Fldw
Felde
FEP
                            See under Varpianen, etc in concriptive,part .: "
                                                                   Field police
Fee
                            Feldpolizei
                            Fernieuer
                                                                   Long range fire
Ferni
                            Femseben
                                                                   Television
Fesh
FES (white execulting,
                            Führungering Sinteretnen (10.) cm
                                                                   Sintered iron musting
such as in 10.5 cm FHGs
                            Feidhaubitzernnate 38 FES)
                                                                   shell 38 PES)
38 FES)
FessB
                            Feaselballos
                                                                   Captive balloon; saveage balloon
                                                                   Fortification: formess: foet
Fest
                            Festvoy
                            Pestungakries.
                                                                   Siege warfare."
Frethe
                            Fener
                                                                   Fire.
F ...
                           · Feuervaline
                                                                   Firenens
Feastw
                            Feuervecker
                                                                  Ordoance sergesse
Famers
FEV (white associting such Fibrongsring, Veicheises (15.3 cm as in 15.2 cm Spep FEV) Sprenggrannte FEV)
                                                                  Soft iron rotating band (is 197 am H# shell)
                                                                   Fortress AA gue; stationary AA gus
                            Fedungaflak
                            Plus saugil bee!
                                                                  Wing of an similane
PF
FF (MX)
                            (Maschineokanone) im Fitigel
                                                                   Rapid fire cannon in the wine of an nicolane
                            einen Fluazeug
                            See under Warpinste, etc (descriptive
FFM (such se
                                                                   Marking on
                            (2 cm Maschingusewske FFM)
2 cm MG FFMD
Fa. Past
                            Pahraestell
                                                                   Chausia
                                                                  Field piece: field gue
FG: FGesch
                           Feldgeschies
PG: PGem; FS|G-42
                            Fallschirminger Gewebe 42
                                                                  Paragroup fully automatic sific
                                                                  Operated by contribugal force (Fa)
Fg: Fl; Flg
(AZ Zed Fg)
                            Plich cowichtsentrieb
                             (Aufschingsünder, Zerleger, Flieb-
                                                                  PD fuse, self-descroying, contribugal (TM 9-1985-3, p 546)
                             gewichteantrieb)
  (Z4Z 8/90 Fa)
                             Zeitzünder, Sekunden 30, Flieb-
                                                                  Mechanical time PD fule in which the motive power was de-
                             gewichtsantreib
                                                                  rived from contributal force: 30 seconds delay (TM 9-1983-3.
                                                                  p 597)
FGesch
                            Femzeschoes
                                                                   Long range projectile
                            Featurewedge 43
FgW-43
                                                                  Fortress mortantized morta
FGZ.
                            See under Warplanes, etc (descriptive section)
Fu
                            Faldhaubicae
                                                                  Field howitzer
FHGr Nb
                            Feldhaubitzeranate Nebel
                                                                  Field howitzer smoke shell
                                                                   Field howitzer abell, steel ring
FHGr Sty
                            Feldhaubitugrance, Stahlei
PHSchr
                            Feldhaphitzachtsnootl
                                                                   Field howitzer shrappel
Pla
                            Fahrsons
                                                                   Vehicle
                                                                  Designation of simplanes manufactured by Fiender C
Fi
                            Figeries
PE'
                            Federkspeel
                                                                   Cap of er a spring
                            Feldkanoos
FE
                                                                  Field cannon
                            Funk
                                                                  Radio
FEFS .
Fl: Pla
                           Flagge
Fl; F teach as is
                            FliebkraftrandenFliebgewichtsantrieb
                                                                  Centrifugalty operated fuze (Time-percussion fune
                            (Doppelzünder Sekunden 60, Flieb-
Dopp Z 8/60 F1)
                                                                  burning time, centrifugal)
                            gavichmanneb
Fla
                            Flugzeugebwehr
                                                                   A# defease
Fischi
                            Flachfeuer .
                                                                   Flat trajectory fire
FlaDdaG
                            Fliegerabwehr Dreifnchmaschinen
                                                                   AA triple machine gus
                            gewebs .
Flak
                            Flugzengebwehrkenoos
                                                                   AA canoon: AA gun
                                                                   20 mm Four-berreled AA gun
Flakvieding 38 (2 cm)
                            2 cm Flugubwehr-Vierling
Floor
                            Flugabwehrmaschineswafter
                                                                   Automatic AA weapons
Flam (B) (such set C-250)
                            Flammrodi Bombe
                                                                   lacendiary bomb filled with flammable oil
FIDE
                            Flügeldiss .
                                                                   Jet motor mounted on a wing
FIDese
                            Fliegerdrebatutae
                                                                   Mesoing makeows to us
Fldw: Feldw: Fdw: Fw
                            Feldwebel
                                                                 - Master Sergeant
FlEinki; FlEshi; Eshi
                            Finschepeinmine: Einmine
                                                                   Glass bottle satisersonnel land mine
(FlEinki 42)
                            (Fluocheneismine 42)
                                                                   (Glass bottle A/P mine 42)
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| FIEsMIZ            | Flascheneisminen Zünder -            | Pressure igniter for A/P glass bottle sine (TM 9-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| •                  | * t * o *                            | 2, p 307)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| FLeucht            | Fall schirmleuchtpatrone             | Parachute-flare signal cartridge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| FISE \$1346        | Flütelmine                           | Fin-stabilized mortar projectile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| FILM               | Flügelminenwerfer                    | Teresta mortar projectile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| PITMI 41; PITMI 41 | * Finserminmune 41                   | Treach-morens firing finned projectiles                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Flugb              | Flusboot                             | Rivet drifting (floating) mine, pattern 41                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Fingse: Fine Fin   |                                      | Flying boat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                    | Flugzeug                             | Aimlene                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| FIV; FmV           | Flammenwerfer                        | Flame thrower                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| FM -               | Feldmarschall                        | Field matchall                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| FMG                | Ferumenagerist                       | Range finder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| FMG                | Flugzengabwehtmaschmengewehr         | Rapid-tire AA machine gun                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Fav                | See FIV                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| · FoF              | See under Warplants (descriptive sec | (aois                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Fp .               | Fülipaiver                           | Filler, filling explosive; bursting charge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Fp02               | Filipulver 02                        | 1902 pattern filling (TNT)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Fp 5 .             | Füllpulver 5                         | TNT costs 5% was                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Fp 68-             | Fülipulyer 88                        | 1888 partern filling (Cast P A)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Pp 60/40           | Füllpulves 60/40                     | 60/40 filling (TNT 60 and Am pitrate 40%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Fp C/07 c          | - Füllpulver C/02                    | Same as Fp 02                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| FPatr              | Feldpatrose                          | Field gus carridge (fixed amounition)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Few                | Fenerwecker                          | Artificer; ordence sergeant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| FS; Focha          | Fallschirm                           | Parachute                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| PSchr PSchr        |                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                    | Feld-Schrepnell                      | Field gus shrapnel ( )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Fap -              | Femaprecher                          | Telephone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Fal; Fe            | Feetung                              | Fortress; fort; fortilication                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| FSt; FuSt; FS      | Funkatelle; Funkacezzation           | Radio station                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| P-Scoff            | Titantetrachlorid                    | Titanium tetrachloride (amoke producing agent)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| FSTe               | Fallschirmsruppen                    | Parachute troops                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Fe                 | Funk; Funker                         | Radio; radio operator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| FuMG               | Funkstenagerät                       | Radar                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| · FuSt             | " See PSt                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| PaTe               | W Franktrupp                         | Signal Corps detachment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| FuTu               | Fookram                              | Radio sending tower                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Peter Ped: Fee     | Fenerverteilung .                    | Fire distribution                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Fw                 | See Fldw                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| PW Pw              | Focke-Walf                           | Designation of sitpianes built by Focks-Walf Co                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| PZ (such as        |                                      | Marking on a clockwork serial burst fuge (See is                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| FZ 60)             | (F Zünder 60)                        | TM 9-1985-2, p 1867                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                    | ( Summer ov)                         | rm >-rdo2-e, h 100)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                    |                                      | The state of the s |
|                    |                                      | M.Z.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                    |                                      | Gas                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 6                  | Gas                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| G; Get             | Gerit                                | Equipment apparatus device                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Ge Gouch           | See Gs                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

G: Geach See Gs Gun; cannot G: Grech Geachines Rifle G: Gew Gewaht ' G; # , Gramm G: Ge Granate G (propelling char Propellant with a standard beat of explosion (69 Palvermanse G (Gallwitz) cillian) Gewehr 1898 Rifle, model 1898 G 98; Gew 98 Gamma Mörner 420 mm Heavy morts Gaussia-Mes Building Gebäude Gbd: Gab Güterbahabo Freight yard Gbb Chemical bomb Gasbonbe GB; GBom Gandruckhile High-pressure carride **GDrH** Geb: Gb Gebira Mountain Gel- (in fuse desig Mountain Gebirgs-(Aufschlagzunder 23 Gebirgageschutz) (PD fuse 23 for mountain ordings AZ 23 Geb) GebG: GebGesch Gebirgageschütz Mountain gun Shall-for mounts in gus Gebirgagranate GebGe Mountain howitzer; pack bowitzer GebH; GebHanb Gebirgninfanteriegenchurn; Gebirge-Mountain infantry gun; or howitser GeblG: GeblG ingerge och uca Mountain cannon GabK

Gebirgskanose

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|-----------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>a.</i>             | Gefreitze                                | Acting corporal; private first class                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Gef                   | Gebeilzelndung                           | Concentrated charge consisting of neveral explosive                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Gobldg                | Generalisation                           | blocks tied mgether, prepared tharge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| ١.                    | Gebaliteledung                           | Prer ared TNT charge, 3kg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| GabLdg 3kg            |                                          | Secteg                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| geb                   | gebeim                                   | loaded                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| gel; Gel              | geledes                                  | Yellow cross (Ger marking on vesicents) (CWS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Gel; Gelk             | Gelbkrenn                                | delivered                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| gal                   | geliefert                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| GemPol                | Gemeindepolisei                          | Township police; local police                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Gea                   | General                                  | General                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| GenSthH               | Generalatab den Heeres                   | Army General Staff                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| gen; sp               | gepaksett                                | amored .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Gen G                 | Gerit                                    | Equipment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Gascia G              | Genchasa .                               | Projectite; missile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Gescle G              | Geschika                                 | Piece; gus; casson                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| GeschGisse ·          | Geschitzgionserei                        | Gun foundry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Gestage *             | Gehelme Stuntupolipei v                  | Secret state police                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Geen Geen G           | Gowelst                                  | Rifle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| GawGe; Gg             | Geweitzmante                             | Rifle grenner                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| GewGrGew .            | Gewehrgranstauge wolk                    | Grenade crile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Genderer              | Gewehreprenggrennen                      | HE rife grenade                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       | - Sezorez                                | nified                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| gay                   | Gencho, sinbrik                          | Shell factory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| GI                    |                                          | Gun factory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Gh GeachFale          | Geschiezisheik                           | Field marrhal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| GENT TO THE PARTY     |                                          | Waight of projectio                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Gg ,                  | Geschosagewicki                          | action of hestacens                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Gg                    | See GevGe                                | Cast Iros                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Gpt Or                | Genegoes                                 | A/T sille grenade                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| GaPs GewGePss         | Gewehrgennete Panner .                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| GGe, Gan              | Gasgreeate                               | Gas greasde                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| _GH                   | See Gebil                                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| GK                    | See Gebil                                | manufacture and the second sec |
| GKast                 | Geweinkernunche                          | Cartridge case                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| GKF                   | gapanette Kampitahrasugu                 | Amored combat vehicle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| GRW                   | Genchützkenfrungen                       | Salf-propailed gun mount                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| GL.                   | Ganleiter                                | District leader                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| gi                    | glatt                                    | amouth; even                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| GL Gla                | Gleichicton                              | Direct current                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| GLA                   | Gewichtladung                            | Weight of live projectile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Gleick                | Gleiskerresinkraeng                      | Full-track vehicle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| GleiskPt              | Gleisketten Pannerinkeneng               | Full-truck acmoved vehicle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| giGusch               | Glatten Geethick                         | Smooth-bore gun                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| GL'spag Gl'spat       | Glimmleuchespur; Glimmupur<br>Glühninder | Tracer with glowing composition dim tracer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Gida                  | Glükzünder                               | Low tension electrical ignites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| FIAM                  | gietta Vurinies                          | Smooth bore mine-thrower shell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Gas                   | Gammanka                                 | Gas mask .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| GN                    | Generalisajot                            | Major General                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| GmbH                  | Gesellschaft mit beschränkter Hafting    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| GNI                   | Geochosomine                             | Mine made from a shell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Go .                  | Goths                                    | Designation of niminates built by Gothace Vaggoufsbrik                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| AP F                  | gepaggest                                | armored                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| GP; G Pulvet          | Gallwitz Pulver                          | DEGDN propellant developed in 1930's by General Uto                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                       |                                          | Gallwirs (See "G" Pulvet in descriptive section)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Get G                 | 'Granate (See also Sprgr)                | Grenade; shell; projectile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>₽</b> ₹            | grava 1                                  | F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Ge .                  | Geesage                                  | Frontier                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| get; Ge :             | George                                   | large                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| ger .                 | prin .                                   | 8746D                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| GeB (such as GeB 39 & | Granathücker                             | Assitant granade rifle                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| GeB*45)               |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| GeBe                  | Genissia Beson                           | Asticoacrete shell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| ArBIP                 | grobes Blättchespulves                   | Propellans in large flakes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| OlleinGe ?            | Gewehr Reichsweite Gennate               | Long-range rifls greasde                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Get                   | Grantfallung                             | Shell filling barming charge of a projectile                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Cut \$8 '             |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                       | Granutilling 88                          | Shell filler, pattern 1888 (picric sold)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Gel 02<br>Gelcs       | Grantfullung 02                          | Shell filles pattern 1902 (TNT)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 475.5                 | Grünkreus                                | Green cross (CWS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
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|                       |                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

grosse Laduag Large charge grosset Flammenwerter Heavy flame-thrower (on two-wheel carrier) GePatr (See Granate Patrone Fixed semmunition HE shell Grandide Grandladung Main charge; base charge GeW Gennarwaries A/T grenade ciffe; grenade projector; morta-GrW Sling Gransewerferfünflige Five-barreled automatic monar GrZ Grapezzünder Fuze for HE shell grZdig grosse Zündladung Large igniting charge; large primer Gs; G; Gesch Geschous Projectile Gus Gup Gudolpul ver Double base DEGDN-NG, low calorific value propellant containing about 30% Gudol (autroguanidine) GuBlo Gudolblättchenpulver Gu propellant in the form of squete flakes GuRP Gudolröhrenpulver Gu rubular propellant GwFSL.sGe Gewehr Pallachina Leuchte Illuminating parachute rifle grenade (TM 9-1985-2, p 339 GwGeGer Gewehrgrauntegerät-Rifle grenade equipment Gwr -See Gew Gw2Gr See GewGe GwrSprgr See GewSprge Hi Hb; Hbe See Hb Ht Haub Haubitze Howitzer Hi Horm Hauptman Captain Army 7b. '981 rebärret. bardened Hexogen RDX bollandisch (b) Dutch (mark on equipment) H5; 1110; H15 erc Hesogen 5, etc RDX + 5, etc per cent was H 15; Hide 15 (H 50 + Pp02 Hohladung 15 Hollow charge containing 15 kg 50/50-RDX/TNT 3083 HA' RDX-Al explosive Hexogen-Aluminium HA-41 Heithgen-Aluminium 41 RDX-Al explosive pattern 41 Hamburg -Designation of Sirplanes built by Blobm & Youn Co, Hambu Hafe His Hafen Post; harbor, Haft: HaftHide Haftbohlladung Magnetic antitank bollow charge Haft H3 -Hafthohiladung, Henogen 3h Magnetic HoC, 3kg RDX Halbpager Halbpanzergranace SAP projectile (literally Half amorpiercias) Haube . See Hb: Hbe 0 Hospitari, HptKari Nain propelling charge in non-tixed ammunition Haupikartusche Hibs Hibes Haube Haube Ballistic cap (false cap or windshield) on so caliber shells (TM 9-1985-3, p 491) HM; HM; Haupthe bahof Nain depots main RR section Shell with ballistic can (BC) PDFs for use under BC Hban HbGe Haubengranate Haubegranatenzunde Haubenschrapnell Schrappel with BC Hamibuch Handbook; manual Helfw Handlenerwaffe Small fire arms HdGe See Hat Hdgr Handgriff HDP Hochdruckoumos See in descriptive section Heinkel Designation of simplanes built by Reinkel Co HF Hochirequeux High frequency (Rad) Hf Heerestahrzeus Army vehicle HF lak Heeresflugsbwehd Arity AA gun HF= Heeren-Funkaselle Army radio station Hgr; HdGs Handgranete " Hand grenade HGr Howitzer shell HGeZ: HbarZ Haubitzegranatenzünde Euze for howitzer shells HGe Holxgeachoes Wooden shell (dummy) HK (black stencilling) Hartkers Tungsten core (lit Hard core) HK; HKarr, HulsKarr. Hülvenkartusch Cartridge (in non-fixed atomo) as opposed to bag Suspended gun mount Hängelnfette HI (black stencilling); HL; Hohlladung Hollow charge (HoC) such as A/T projectiles, ah charge HI/A; HI/B at HI/C Types of bollow charges (See TM 9-1985-3,

pp 407, 411, and 313)

Ge+ 121

(Sprengcylindrinche Bombe 50 1/2)

body and pressed steel nose (TM 9-1985-2, p8)

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Hobiladungsbombe
                                                                                                                                                   Ja (in bomb denignati
                             Hohiladung 12.5 kg
                                                                    Prepared HoC, 12.5 kg TNT
 Hlds 12.5 kg
                                                                                                                                                                               (Sprengcylindrieche Bombe 50:1a)
                                                                                                                                                   SC 50 (a)
                                                                                                                                                                                                                       Marking on a 50 kg HE cylindrical bomb having o
 Hide 50 kg
                             Hohiladung 50 kg
                                                                    Prepared HoC. 50 kg, in two pares
                                                                                                                                                                                                                       piece drewn steel body (TM 9-1985-2, p 6)
                                                                    Office of Army Ammunition
 HMA
                             Heereeammitionsangrals
                                                                                                                                                                              Jagdbombet
                                                                                                                                                   jabo
                                                                                                                                                                                                                       Pursuit bomber
 HMi
                            Holzman
                                                                    Vooden mine --
                                                                                                                                                                                See I: lag: ler
                                                                    Army Ammunition Depot
 HACL
                             Heere unvaitsonals ger
                                                                                                                                                                                ispanisch
                                                                                                                                                                                                                       lapanèse (marking on equipment)
                            Horchpostes
                                                                    Listening post
 HP
                                                                                                                                                  IB (in bomb designation
                                                                                                                                                                                                                        Marking on a 50 kg HE cylindrical bomb, an im
                                                                   Chief, principal
                             Haupt
                                                                                                                                                                                (Sprengcylindriache Bombe 50 1B)
                                                                                                                                                   Sc 30 1B)
                                                                                                                                                                                                                       version of ! (TM 9-1985-2, p 8)
                                                                    Capital
 Hot: Hotet
                            Hamptetade
                                                                                                                                                   IC (in bomb designation
                                                                                                                                                                                                                       Marking on a NE cylindrical bomb having drawn steel
                             Hauptkartusche
                                                                    Majo propellage charge in annualting other than fixed
 HotKart HauptKart
                                                                                                                                                                                (Sprengcylindriache Bombe 50 JC)
                                                                    Base charge of blasting cap of detonator (lit main charge).
                                                                                                                                                   SC 50 JC3
                                                                                                                                                                                                                       body and pressed steel nose (TM 9-1985-2, p 8)
Hot L
                             Hauptleduss.
                                                                                                                                                   JF (such as
                                                                                                                                                                                                                       Marking on a clockwork long-delay teniter (TM
                                                                    Captain
                            Hadptmann
                                                                                                                                                   1F-50-0
                                                                                                                                                                               (1-Feder 104)
                                                                                                                                                                                                                       9-1985-2, p 309)
                            Kauptwachtmeister
                                                                   First sergeant (Arty or Cavy)
 Horwan
                                                                                                                                                  · IG: IGeock
                                                                                                                                                                               Jagetgeschütz
                                                                                                                                                                                                                       Light infantry piece (gun or howitzer)
 MPage
                            Halbpanzergrenate
                                                                    SAP projectile
                                                                                                                                                  JedPs (Psiac)
                                                                                                                                                                                Jagdpanker (Panzaringer)
                                                                                                                                                                                                                       (Tank destroyer; tank hunter (See under Panser in the
                                                                   Recaining ting ...
 HRE
                            Haltering .
                                                                   Propellant in rings for light field howiever
                            Hambita Ringo ul ver
                                                                                                                                                                                                                       descriptive part)
 HREP
                            Henocitei .
                                                                    Designation of amplanes and guided missiles built by
                                                                                                                                                   Jas
                                                                                                                                                                                See I: 15g ....
                                                                    Hensebel Co .
                                                                                                                                                   Jan JGe
                                                                                                                                                                                Jägergranste
                                                                                                                                                                                                                       Light infantry cup projectile
                            Haubita-Schropell
                                                                    Howitzer chrapnel
                                                                                                                                                                                Jacergranatzünder
                                                                                                                                                                                                                       Percussion fuze for use with light infantry gun projectiles
 Hacht
                                                                                                                                                   lasZ.
                                                                   Turner howitzer (See auch leHT)
                                                                                                                                                                                                                       Designation of similanes built by Junkers Co
 HT
                            Haubitze-in-Talm
                                                                                                                                                                                Innkers
HTA
                            Hespen-Trospl-Aluminium
                                                                   RDX-THT-Al emplosive mixture
 Hüskan
                            See HE: HEAR, etc.
                                                                   Marking on a mechanical impact bomb fuse type 3
Her (such as is
                            (Aufschlagzünder C(Hus)" 3)
                                                                                                                                                                               Kalium
                                                                                                                                                                                                                       Potessium
                                                                    Army Ordnance Office (Branch of the OEH)
 HWA: HWAA
                            Herrewallwanus
                                                                                                                                                                                                                       Cannon
                                                                                                                                                  Ki Kan
                                                                                                                                                                               Kasons
                            See under Warniagen (descript
                                                                                                                                                                                                                       Carbine
 HYZ
                                                                                                                                                   K: Kan Kb
                                                                                                                                                                                Mambine
                                                                    Amer. Ordennee and quarternames departmen
HZ&A
                             linezes non gemt
                                                                                                                                                                               Kartiteche
                                                                                                                                                                                                                       Case shot; caniste
                                                                                                                                                  R: Kt
                                                                                                                                                                                                                       Casemate
                                                                                                                                                                               Kanematte
                                                                                                                                                   K (such as:
                                                                                                                                                                                                                       (37 mm A/T Cannon, Fixed Defense)
                                                                                                                                                  3.7 cm Pak K
                                                                                                                                                                              (3.7 cm Paszerabi
                                                                                                                                                                               Kastes
                                                                                                                                                                                                                       Box case; magazine .
                            ing in ins
                                                                   in in the
                                                                                                                                                                                Kecsi
                            lafactorie
It led
                                                                   lafaetry
                                                                                                                                                                                Kring
                                                                                                                                                Al is tupe designation
                                                                                                                                                                                                                       Time and percussion fuze, pattern 28 for
Li Ling
                             Incominge
                                                                   Engineer
                                                                                                                                                                               Kanons
                                                                                                                                                                               (Doppel Zünder 28 Kanone
 cis
                             izalioni sch
                                                                   Italian (marking on equipment)
                                                                                                                                                                                                                        velocity gue (TM 9-1985-3, p 603)
                                                                                                                                                   Dogo Z 2800)
14A
                            Inspecteur der Artillieria
                                                                   Inspector of Amillery
                                                                                                                                                   Kr Keet
                                                                                                                                                                                Kasten
                                                                    lainatry piece: infantry howitzer
 IG: IGesch
                             Infanteria po se bacu
                                                                                                                                                                                                                        Folding safety device (Fuze equipped with dalay action
                                                                                                                                                   & (in fuze designation
                                                                                                                                                                                Klappenálcherona
                            luceroswengemeinschaft
                                                                    Association for Furtherance of Mutual In
                                                                                                                                                                                                                       and folding safety device) (TM 9-1985-3, p 580)
                                                                                                                                                   mVnE)
                                                                                                                                                                               (mit Vernögerung und Klappennicherun
                            luternasingemeinschaft Farbna-
 IGF schee
                                                                   Die ledustry Trust
                                                                                                                                                                                                                        Marking on a HE cylindrical bomb of three piece con
                                                                                                                                                   K (la bomb designation
                            industrie
                                                                                                                                                                                                                        etrortice (TM 9-1985-2, p.8)
                                                                                                                                                                                (Sprengcylindrinche 250-K)
                                                                                                                                                   Se 250-K)
                                                                                                                                                                                                                       240 mm Gun with range up to 50 km
280 mm Gun with range up to 50 km
 Kiench
                            See IC: IGenth
                                                                                                                                                   K3
                                                                                                                                                                                Кицева 3
                            Infanteriegeschies Kompanie
                                                                   infantry howitzer compan
 IGK.
                                                                                                                                                   .KS
                                                                                                                                                                                Ennone 5
ige.
                            lalanteriegranase
                                                                    Shell for infractymiece
                                                                                                                                                                                                                       211 mm Gun with range up to 120 km
                                                                                                                                                                                Kanone 12 .-
                                                                                                                                                   E12
 lac2
                             Infuntarioscupato-Zunder
                                                                    infancry shell fuze
                                                                                                                                                                                                                        105 mm and 150 mm Guns, papers 1918
                                                                                                                                                   KIR
                                                                                                                                                                                Kanonen 18
                                                                   on howitzet mount; on howitzer carriage
                                                                                                                                                                                                                       105 mm Gun pattern 1918/1940
 INL
                             in Haubito-Lafette
                                                                                                                                                                                Kanone 18/40
                                                                                                                                                   K 18/40
                                                                    in the year
                            im Inher
                                                                                                                                                                                hiels
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                                                                                                                                                   R: kl
 ikl. iKaslat
                                                                   in casemate mount
                                                                                                                                                                                K listenartillerie
                                                                                                                                                                                                                       Const artiflery
                            la Kasematten-Laferte
 ik mt. af
                            in Küsten-Lafette
                                                                    in coast defense mo
                                                                                                                                                                                                                       Caliber
                                                                                                                                                                                Kuliber
                                                                                                                                                   Kal
                                                                                                                                                                                                                       Carbine pattern 1898, short (length of barrel 600 mm)
                            la Ladestraifes
                                                                                                                                                                                Karabiner 98 kurz
                                                                                                                                                   Ker 986
 Mrstal
                            in Micrael stotte
                                                                                                                                                                               Kartateche.4.
                                                                                                                                                                                                                        Case shot; canister shot
                                                                    IN MOUTHS INCOME
                                                                                                                                                                                                                       Carrowcher container of propellunt charge not used in fixed annualities
iPL: iPalai
                            in Passer-Laferra
                                                                    is shielded mount
                                                                                                                                                                                Kamachi
                                                                                                                                                   Kart (Compare with Patr)
                            in Rad-Lafette
 irl: ittlat
 iSL: iSLaf
                             is Schire-Laferre
                                                                    On carriage with overhead
                                                                                                                                                                                Karraschbestel
                                                                                                                                                                                                                        Propellent bag
                                                                                                                                                   Keetb
IZ: In
                                                                                                                                                                                                                        Cover for Kartunche (a v )
                             laseasim de-
                                                                    laternal fune
                                                                                                                                                                                Kartuschdeckel
                                                                                                                                                   Kartd
                                                                                                                                                                                                                       Bag container of propelling charge placed in Kartuschen
                                                                                                                                                                                Karrusche jeinfach
                                                                                                                                                   Kast ala
                                                                                                                                                                                                                        hillse (q v)
                                                                                                                                                                                Karruschenhiles
                                                                                                                                                                                                                        Cartridge case for Kartusches
                                                                                                                                                   Kattle Kartli
 J: Jäg: Jg:
                                                                                                                                                                                                                        Andunition using Kartuschen (Compare with Patrones
                            Jåges
                                                                    Ranger; sifteman in light infantry; pursuit plane
                                                                                                                                                                                Kartuschenmenition
                                                                                                                                                   Keeth
                             lagdflugzen
                                                                                                                                                                                                                        munition)
                                                                    Parsuit plane
                             Jahr
                                                                    Yest
                                                                                                                                                                                Karuschesvodine
                                                                                                                                                                                                                        Cold adhesive putry used for attaching demolition charges
                             iähelich
                                                                   Tearly
                                                                                                                                                                                Kaltklebekitt
                                                                                                                                                   Ket
                             judiech
                                                                                                                                                                                See Kr Kat
                                                                                                                                                   Kb
                                                                    Yuguslavian (marking on compment)
                             ingoalawiech
                                                                                                                                                                                                                        Platform mounted causes
                                                                                                                                                                                Kanone in Bettung
Kampfetoffcylindrische (Bombe)
                                                                                                                                                   KBest.
 J (in bomb designation
                                                                                                                                                                                                                        Chemical cylindrical, this walled bomb; gas bomb
                                                                    Marking on a 50 kg HE cylindrical bomb having one-pieco
                                                                                                                                                                                                                        Chemical cylindrical incendiary bomb (TM 9-1985-2, pp 52-5)
                                                                                                                                                   KC (Box
 SC 50 1)
                            Sprengevijadriache Rombe 50 11
                                                                    some and body (TM 9-1985-2, p 8)
                                                                                                                                                                                Kampfeylindrische Flamme
                                                                                                                                                   EC Flon (Boule
                                                                                                                                                                                                                        Association for welfare of workers (lit strength through
 3/2 (in bomb designation
                                                                    Marking on a 50 kg HE cylindrical bemb having drawn areas
                                                                                                                                                                                Kanfe dutch France
                                                                                                                                                   KDF
                                                                                                                                                                                                                        joy), is financed the construction of Volkswages and some
 SC 50 1/21
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| <b>文(王)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Ensone (Eixonbahn)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | KHIITOMG ROD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| RG .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Kavaleriegeschikz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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                                                                                             | Firecracker (simulated fity)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              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| En (Pulver)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Erunback blicae (Pulver)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Fireceacker (simulated file) DEGDN-PC propellant overchizing small amount of E mirrate (CDS 31-62, p5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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                                                                                                                                                                                                                                                      | Gun percussion fuze; cannon shell funn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           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| En<br>EN (Pulve)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Erunback Micrae (Pulver)  Knickenadus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Firecracker (simulated lite) DEGDN-NC propellant containing small amount of K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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| En (Pulver)<br>EnZ<br>EnZdicks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Esundack Missus (Pulves)  Kaicksmidus See K25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Fireconcier (simulated lier) DEGDN-NC propellinat containing small amount of K siznate (CDS 3 h-C2, p5) Sagn-type ignites                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Evil.  E2.  En E2; EpiZ; Esde (in designation of annal, such                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Sue Eptul<br>Enconnumber<br>Epptumber                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Gun percuasion (une; cannon abell fune Point detonating fune (PDFs) under a ballimic cup.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| En<br>EN (Pulve)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Erunback Micrae (Pulver)  Knickenadus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Fireceacker (simulated file) DEGDN-PC propellant overchizing small amount of E mirrate (CDS 31-62, p5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Evil.  E2.  En E2; EpiZ; Esde (in designation of same), such                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | See Eptek<br>Kassacramoder<br>Keptzinder<br>(8.9 cm Sorvagaranate Lange 4.5,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Gus percuasion fuze; cannon ubell fum Point Actossing fuze (PDFs) under a balliutic cap, except in the case of the XZ-36, an ordinary PDFs (TM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| En (Pulver)<br>EnZ<br>EnZdicks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Erunback Missus (Pubves)  Kaick sindus See E25  Krunbach(Pubvar)nhae Missuss aber                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Firecoccier (simulated flar) DEGOPH-NC propertiese containing small amount of K nizzate (ClOS 51-62, p5) Sasp-type i gaines Same as KNP-plum) except that K napon was replaced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Kwil<br>EZ<br>Kuj KZj KpfZj Kodr (in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | See Epter<br>Kanoarnender<br>Kopfninder<br>(8.8 cm Sprenggranne Linge 4.5,<br>Kopfninder) which means 88 am HE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Gun percuasion (une; cannon abell fune Point detonating fune (PDFs) under a ballimic cup.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        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| En (Pulver)<br>EnZ<br>EnZdicks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Exumback blazus (Pulves)  Knicksündus fon EZ3  Krunhach(Pulvus)uhas ditrats abes alt Dialessoolusi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Fire-conciser (simulated liter) DEGON-NO: Computing containing small amount of K sizence (CROS 31-62, p5) Supplying ignitive Same as KMP sizency succept that K suppos was replaced by DMT (CROS 31-62, p5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Rvil.<br>R2.<br>Rxi. R2; RpiZ; Rade (in<br>designation of annil), such<br>as 8.0 cm SpeGe L/4.5 (Ex)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | See Epter<br>Kanoarnender<br>Kopfninder<br>(8.8 cm Sprenggranne Linge 4.5,<br>Kopfninder) which means 88 am HE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Gus percuasion fuze; cannon ubell fum Point Actossing fuze (PDFs) under a balliutic cap, except in the case of the XZ-36, an ordinary PDFs (TM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| En (Pulver)<br>EnZ<br>EnZdicks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Erunback Missus (Pubves)  Kaick sindus See E25  Krunbach(Pubvar)nhae Missuss aber                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Firecoccier (simulated flar) DEGOPH-NC propertiese containing small amount of K nizzate (ClOS 51-62, p5) Sasp-type i gaines Same as KNP-plum) except that K napon was replaced.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Rvil.<br>R2.<br>Rxi. R2; RpiZ; Rade (in<br>designation of annil), such<br>as 8.0 cm SpeGe L/4.5 (Ex)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | See Eptek<br>Kassacramoder<br>Keptzinder<br>(8.9 cm Sorvagaranate Lange 4.5,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Gus percuasion fuze; cannon ubell fum Point Actossing fuze (PDFs) under a balliutic cap, except in the case of the XZ-36, an ordinary PDFs (TM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| En CPulved  EnZdSche  EOD (Pulved)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Erundack Micrat (Pubret)  Raick sunder See EZS  KrundachPubrutuhae Micrate aber ant Disisseoluol besi ch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Firecoccier (simulated fire) DEGOPH-NC propertiese contactining small amount of K nitrate (ClOS 31-62, p5) Sosp-type i guitree Some as ENP-niver) except that K n-5000 was replaced by DNT (ClOS 31-62, p5)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Evil E2<br>E2 E2; EpiZ2; Eade (in<br>designation of same), such<br>so E3 cm SprGr L/4.5 (E2)<br>km E5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | See Eptuk & annenminder<br>Kopplinder<br>(8.8 cm Sprenginnare Lings 4.5,<br>Kopfninder) which means 88 cm HE<br>abell, 4.3 calibers long with PDFs<br>turns<br>turns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Gus percussion fuse; cannon shell fugs.  Point detoneting fuse (PDFs) under a ballistic cap, except in the case of the KZ-30, as ordinary PDFs (TM 5-1987-3, p 543)  short                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| En (Pulver)<br>EnZ<br>EnZdicks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Enumback blicast (Pulves)  Raick rundout fee E23 EvanhackPulvarluhae Hisrats aber alt Dinisseelsel besi e4  King bejonnie                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Fire-cocker (timutated litr) DEGOPH-NC proprilease containing small amount of K sitence (CDS 31-62, pS) Super-type ignites Same as EMP sitens) except that K suppose was replaced by DMT (CMS 31-62, pS) Control Riled Very giptol                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Red SZ. RpfZ; Eade (in designation of annal, each on S.I cm SpcGt L/4.5 (Kz) km Kn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | See Epter Rasonenander Rasonenander Rapptninder (8.8 cm Sprengpannte Länge 4.5, Koptsinder) which menns 85 um HE abell, 4.5 cmlibers long with PDFs hurs hurse Autochlagzlieder.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Cus percuasion (nas; cannon shell fram  Poiss detoneting funs (PDFs) under a bellistic cus, except in the case of the XZ-38, an ordinary PDFs (TM 9-198-3, p 343)  abort Short percuasion (impact) frame                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| En (Pelver)  EnZ EnZibbs EOD(Pelver)  hos EP; EDiss E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Enumber Micrae (Pulvot)  Enick mader for E29  KrushachPulvarbahoe Nitrate aher akt Disitoosiuol komirch Khap planate Koppa                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Firecoccier (simulated line) DEGOPHAT (propelline) containing small amount of K nizzate (ClOS 31-62, p5) Same an KIRP pivor) except that K napos was replaced " by DNT (ClOS 31-62, p5) Central Rifled Very gional Cape of projectile or hane)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Rvii. R2 Rz; RziZz Ezdr (in devignation of numb, ouch on Ril cm Spriir L/4.5 (Kz) kz; Kz kzakzi kzikd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | See Eptuk & annenminder<br>Kopplinder<br>(8.8 cm Sprenginnare Lings 4.5,<br>Kopfninder) which means 88 cm HE<br>abell, 4.3 calibers long with PDFs<br>turns<br>turns                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Gus percussion fuse; cannon shell fugs.  Point detoneting fuse (PDFs) under a ballistic cap, except in the case of the KZ-30, as ordinary PDFs (TM 5-1987-3, p 543)  short                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| En CPulved  EnZdSche  EOD (Pulved)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Enumback blicast (Pulves)  Raick rundout fee E23 EvanhackPulvarluhae Hisrats aber alt Dinisseelsel besi e4  King bejonnie                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Firecoccier (simulated flar) DEGOPHAT (propelline) containing small amount of K nizzate (ClOS 31-62, p5) Sape-type i gainer Sapes as KRP piver) except that K napos was replaced " by DNT (ClOS 31-62, p5) Central Rifled Very gional Cape of projectile or hane)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Rvii. R2 Rz; RziZz Ezdr (in devignation of numb, ouch on Ril cm Spriir L/4.5 (Kz) kz; Kz kzakzi kzikd                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Sow Exploit Rannanounder Reptiminer Reptiminer (8.8 cm Sovengshante Linge 4.5, Koptsindedt which menne 88 gm HE abeill, 4.3 calibers long with PDFs hurs hurner Aufechlagslinder, hurner Bounnalunder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Ous percussion fuse; cannon shell fuse  Point detonating fuse (PDFs) under a ballistic cap, except in the case of the KZ-36, as ordinary PDFs (TM  9-1983-3, p 543)  about Short percussion (impact) hase Short percussion fuse                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| En (Pulvet) EnZéloha EOZéloha EODél'ulvet) hos EP: EFlot EP: EFlot Ep: EFlot Ep: EFlot                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Erumbach blichus (Pulvet)  Enick innder  See EZS  ErumbachiPulvarbahae blitrate aber  ant Dissipation blichuse aber  ant Dissipation blitrate aber  Expiration blichuse blitrate aber  Expiration blitra | Firecoccier (timutated litr?) DEGOPH-NC propellant containing small amount of K sitence (CDS 31-62, pS) Super-type ignites Same as EMP slow) except that K supers was replaced by DMT (CDS 31-62, pS) Control Cape of projectile or fear) pari                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Evil E2<br>E2 Exp E2; EpiZz Lade (in designation of samb, out in Sprice L/4.5 (E2)<br>Exp E2 Exp E2 Exp E2 Exp E2<br>Exp E2 Exp E2 Exp E2 Exp E2<br>Exp E2 Exp E2 | See Epter Rasonenander Rasonenander Rapptninder (8.8 cm Sprengpannte Länge 4.5, Koptsinder) which menns 85 um HE abell, 4.5 cmlibers long with PDFs hurs hurse Autochlagzlieder.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Gus percuasion fune; common shell funs  Point detoneting funs (PDFs) under a ballistic cap, except in the case of the KZ-38, as ordinary PDFs (TM 9-1985-3, p 343)  about Short percuasion (laspact) fune Short buse detonating fune Short Duse detonating fune                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| En (Pelver)  EnZ EnZibbs EOD(Pelver)  hos EP; EDiss E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Enumbert Micrae (Pulvet)  Raict Sinder  See K23  ErushachPulvarbahas Mirrats aher aki Distanceluol  Lemirch  Khap plannie  Keppe  See yadet Vamplaans, and in descriptive  Knap i                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Firecocker (simulated line) DEGOPHAT (propellane containing small amount of K nizzae (ClOS 31-62, p5) Sap-type ignites Sap-type ignites by DNT (ClOS 31-62, p5) Contain KRP pivon) except that K napos was replaced by DNT (ClOS 31-62, p5) Contain Niled Very gional Cape of projectile or hase) part Combat pastel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | KwE<br>\$22<br>Km \$22; Km\$23; Ender (in<br>designation of camb, each<br>can \$3.0 mm Syrie L/4.5 (Ka)<br>km; Kn<br>km\$4.1<br>km\$4.2<br>km \$25 cm BrK(\$5)<br>\$2.0 Bedon (reach as in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Sow Exploit Rannanounder Reptiminer Reptiminer (8.8 cm Sovengshante Linge 4.5, Koptsindedt which menne 88 gm HE abeill, 4.3 calibers long with PDFs hurs hurner Aufechlagslinder, hurner Bounnalunder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Gus percuasion fune; common shell funs  Point detoneting funs (PDFs) under a ballistic cap, except in the case of the KZ-38, as ordinary PDFs (TM 9-1985-3, p 343)  about Short percuasion (laspact) fune Short buse detonating fune Short Duse detonating fune                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| En (Puired)  EnZ  EnZeliche  EOB (Puired)  bon  EP; EStlen  Ep  Ep  Ep  Ep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Erumback blictus (Pulvet)  Enick inniver  Enick inniver  Enick inniver  Enick inniver  ErumbackiPulvurbahan blittunes abey  anti Diniunceluwi  Lomi rch  Kinp piamade  Kippa  Enipal                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Firecoccier (simulated fire) DEGOPH-NC propriess conscious analy anneus of K sizuse (COO 51-62, p5) Sape-type issuites Same as EMP-sirus) except that K access was replaced by DNT (COO 51-62, p5) Control Rifled Very piecel Goudent battle Combat battle Need, note (of a bank); point (of a shell)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Evil E2<br>E2 Exp E2; EpiZz Lade (in designation of samb, out in Sprice L/4.5 (E2)<br>Exp E2 Exp E2 Exp E2 Exp E2<br>Exp E2 Exp E2 Exp E2 Exp E2<br>Exp E2 Exp E2 | Sow Exploit Rannanounder Reptiminer Reptiminer (8.8 cm Sovengshante Linge 4.5, Koptsindedt which menne 88 gm HE abeill, 4.3 calibers long with PDFs hurs hurner Aufechlagslinder, hurner Bounnalunder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Ous percussion fuse; cannon shell fuse Point detoneting fuse (PDFs) under a ballistic cap, except in the case of the KZ-38, as ordinary PDFs (TM 9-1987-3, p. 543)  short base detonation (lapact) have Short percussion (lapact) fuse Short Date detonating fuse Short 200 mm Brune Rulloud Gus Markings on a container with 19 parachetes and three SL)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| En (Paired)  EnZ.  EnZ.Stele  EnD.O'mired)  bos  EP ESPles  Esp.  | Erumback Missa (Pulves)  Enick innder  See E23  Krumback? wirdbake Nitrate aber  ant Distruction of  Loui vol.  King pinnie  Kippa  See yarder Waspinase, atc in descriptive  Kop  Kop  Kop  Kop  Kop  Kop  Kop  Ko                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Firecoccier (simulated flar) DEGOPH-NC propertiese containing small amount of K nizzac (ClOS 31-62, p5) Sap-type ignites Sap-type ignites by DNT (ClOS 31-62, p5) Contain KRP pivor) except that K supers was replaced by DNT (ClOS 31-62, p5) Contain Note of the containing special Rifled Very girend Cap of jurisectile or thane) part Combant bestele Reach more (of a bumbh) point (of a shell) Trank (if Realle car)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Knik  EZ  EZ  EX  EX  EX  EX  EX  EX  EX  EX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Sow Kybuk<br>Kanonensinder<br>Kypt.linder<br>(& em Sprongspanate Lings 4.5,<br>Koptsiinderd which menn ES ym HE<br>nimit. 4.3 enilbers long with PDFs<br>turn<br>kurse Audecklagziinder,<br>kurser Audecklagziinder,<br>kurser Bodenniinder<br>kurse Ze em Betsie Kanone (Elsenbaha)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Gus percuasion fune; common shell fune  Point detendating fune (PDFs) under a ballistic cap, except in the case of the KZ-36, as ordinary PDFs (TM 9-198-5, p 343)  about  Short percuasion (laspact) fune Short bouse detonating fune Short bouse detonating fune Short bouse detonating tune  Markings on a container with 19 parachisters and three SL1 benibs (TM 9-198-2; p 108)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| En (Paired)  EnZ.  EnZ.Stele  EnD.O'mired)  bos  EP ESPles  Esp.  | Erumback Missa (Pulves)  Enick innder  See E23  Krumback? wirdbake Nitrate aber  ant Distruction of  Loui vol.  King pinnie  Kippa  See yarder Waspinase, atc in descriptive  Kop  Kop  Kop  Kop  Kop  Kop  Kop  Ko                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Firecoccier (simulated fire) DEGOPH-NC propriess conscious analy anneus of K sizuse (COO 51-62, p5) Sape-type issuites Same as EMP-sirus) except that K access was replaced by DNT (COO 51-62, p5) Control Rifled Very piecel Goudent battle Combat battle Need, note (of a bank); point (of a shell)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Net<br>EZ<br>EX EX EXP(E) Hade (in<br>developments of seamly seet it<br>see E.B cm Sysfer U.4.5 (Ex)<br>Exp Ex<br>Exp Ex<br>Exp Ex<br>Exp Ex<br>Exp Ex<br>EX Boden (such us in<br>AB 200 EZ Boden)<br>EXFlate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Sow Eyber,  E nanoersander  Kppfzinder  Kmpfzinder  Kmpfzinder  Kmpfzinder  Kmpfzinder  Kmpfzinder  Kmpfzinder  Kmpfzing-Fingargabwehrkanone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Ous percussion fuse; cannon shell fuse Poist detoneting fuse (PDFs) under a ballistic cap, except in the case of the KZ-36, as ordinary PDFs (TM 9-199-3, p. 543)  short base detonation (laspart) hase Short pure detonating fuse Short Date detonating fuse Short Date occuliates with 19 parachetes and three SL2 bombs (TM 9-199-2; p.106) Motorized AA gas                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| En EN (Puived)  EnZ  EnZEche  EnOPPuived)  bon  EPI EDIon  Epi  Epi  Epi  Epi  Epi  Epi  Epi  Ep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Enumback blicase (Pulves)  Enick inneter  Son EZS  ErumbackiPulvarbahan blicanes aben  ant Dissinceshool  Jeni rch  Kinp pla mande  Koppa  Soe under Vapilnase, and in descriptive  Kanpi  Enpl  | Firecoccher (simulated fire) DEGOPH-NC proprient constaining small assesses of K sizute (CIOS 51-62, p5) Sape-type inguire  Same as KMP palvar) except that K aspess was replaced by DNT (CIOS 31-62, p5) Constai Rifled Very pisses  Grave of provincials or frame)  Comback battle  Nated, have (of a humb); point (of a shell) Task (iff Busile cm)  Assistant defense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Red RZ EpiZy Hade (in dealgastins of annal, each on ER can Spece L/4.5 (Kz) km Kz km                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Sow Kybuk Kanonensinder Kypt.linder (S. cm. Sprongspanate L.Kage 4.5, Koptsinder) Koptsinder Koptsi | Gus percuasion fune; common shell fune  Point detendating fune (PDFs) under a ballistic cap, except in the case of the KZ-36, as ordinary PDFs (TM 9-198-5, p 343)  about  Short percuasion (laspact) fune Short bouse detonating fune Short bouse detonating fune Short bouse detonating tune  Markings on a container with 19 parachisters and three SL1 benibs (TM 9-198-2; p 108)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| En (Paired)  EnZ  EnZElche  EOD Ordren)  bos  EP EBles  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Erumback Missa (Pulves)  Enick innder  See E23  Krumback? wirdbake Nitrate aber  ant Distruction of  Loui vol.  King pinnie  Kippa  See yarder Waspinase, atc in descriptive  Kop  Kop  Kop  Kop  Kop  Kop  Kop  Ko                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Firecoccier (simulated flar) DEGOPH-NC propertiese containing small amount of K nizzac (ClOS 31-62, p5) Sap-type ignites Sap-type ignites by DNT (ClOS 31-62, p5) Contain KRP pivor) except that K supers was replaced by DNT (ClOS 31-62, p5) Contain Note of the containing special Rifled Very girend Cap of jurisectile or thane) part Combant bestele Reach more (of a bumbh) point (of a shell) Trank (if Realle car)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Red RZ EpiZy Hade (in dealgastins of annal, each on ER can Spece L/4.5 (Kz) km Kz km                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Sow Kybuk Kanonensinder Kypt.linder (S. cm. Sprongspanate L.Kage 4.5, Koptsinder) Koptsinder Koptsi | Gus percussion fuse; cannon shell fuse  Point detonesting fuse (PDFs) under a ballistic cap, except in the case of the KZ-36, as ordinary PDFs (TM 9-195-2, p 243)  short  Short percussion (impact) fuse Short bense detonating fuse Short 20 mm Brune Railined Gus  Matflage on a container with 19 parachisters and three SL/2  benshe (TM 9-195-2, p 108)  Motorized AA gus  Power-drugs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| En (Puivau)  EnZ  EnZEche  EnZEche  EODOPuivau)  boa  EPI EBIon  EA  EA  EA  EA  EA  EA  EA  EA  EA  E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Enumback blicase (Pulves)  Enick inneter  Son EZS  ErumbackiPulvarbahan blicanes aben  ant Dissinceshool  Jeni rch  Kinp pla mande  Koppa  Soe under Vapilnase, and in descriptive  Kanpi  Enpl  | Firecoccher (simulated fire) DEGOPH-NC proprient constaining small assesses of K sizute (CIOS 51-62, p5) Sape-type inguire  Same as KMP palvar) except that K aspess was replaced by DNT (CIOS 31-62, p5) Constai Rifled Very pisses  Grave of provincials or frame)  Comback battle  Nated, have (of a humb); point (of a shell) Task (iff Busile cm)  Assistant defense                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Note  RZ RATZ, EAGZ, Each (in development of same), seeth on R.B (on SyrCa L/4.5 (Kz) lands   km Ka kands   km Ka             | Sow Eyberg  E Anoneraunder  Kopfninder  (R.S em Syrengyanate Linge 4.5, Koptsinderd which menne 88 gm, HE abell, 4.5 enlibers long with PDFs hurse  hurse Autochingsinder, hurse Bodenninder hurse 22 cm Betwe Kanone (Elsenbah)  Kraftzung-Flugzerganbwahtanone Kraftzung  Kraturus Plunzerbiichas 41(Kraftzung)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Ous percussion fuse; cannon shell fuse Point detonesting fuse (PDFs) under a ballistic cap, except in the case of the KZ-36, as ordinary PDFs (TM 9-1987-3, p. 543)  short base detonating fuse Short pure detonating fuse Short Date detonating fuse Short Date container with 19 parachetes and three SL2 bombs (TM 9-1987-2; p.108) Motorized AA gas  Power-dramp (Heavy h/T power-shrives rifle)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| En (Puivau)  EnZ  EnZEche  EnZEche  EODOPuivau)  boa  EPI EBIon  EA  EA  EA  EA  EA  EA  EA  EA  EA  E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Enumbach Micras (Pulves)  Enick innder  Sen EZS  ErunhachiPulvurhahan ditrase aber  ant Dinivoroluvi  Jeni 104  Kinp bi made  Koppa  See pader Vanplanse, and in descriptive  Enpl   | Firecoccier (simulated fire) DEGOPH-NC propelinat containing small assesses of K sizuate (CIOS 51-62, p5) Sage-type ignive  Same as EMP niver) except that K aspect was replaced by DNT (CIOS 51-62, p5) case all Rifed Very gioral Rifed Very gioral Rifed Very gioral Top of provincitie or frame) herr Contain the containing  | Evil E2 En E2, Ep/E2, Hade (in development of annul, out him for large annul, out him for large annul, out him find annul, out him find an annul, out him find an 25 cm British in 25 cm British              | Sow Kybuk  Rancensinder  Kypfilinder  (Ma cm Sprongipanate Llage 4.5,  Kopfulinder  Mall, 4.5 emilbers long with PDFs  shell, 4.5 emilbers long with PDFs  hurser Autochiagnideder  hurser Bodmailander  kurser Bodmailander  Kraftung-Flugzenganbwehriannoss  Kraftung  (acthward Pannerbisches 41(Kraftung)  Kassensibleder Genate file Gebierer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Gus percussion fuse; cannon shell fuse  Point detonesting fuse (PDFs) under a ballistic cap, except in the case of the KZ-36, as ordinary PDFs (TM 9-195-2, p 243)  short  Short percussion (impact) fuse Short bense detonating fuse Short 20 mm Brune Railined Gus  Matflage on a container with 19 parachisters and three SL/2  benshe (TM 9-195-2, p 108)  Motorized AA gus  Power-drugs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| En (Puived)  EnZ. EnZ.Sche EOD Ordren  boa EP; EPlet Epf                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Erumback Minns (Pulves)  Enick sinder  See E23  ErumbackPulvarbahe Mirans aber  and Distression  Loui ref.  Kapp jamaie  Kapp amaie  Kapp amaie  Kapp in ama | Firecoccier (simulated flar) DEGOPH-NC propellane containing small amount of K nizzae (ClOS 31-62, p5) Same as KNP alver) except that K sources was replaced by DNT (ClOS 31-62, p5) Contact Nilled Very piceal Cape of projectile or hase) part Combact battle Read, nose (of a bank) point (of a shell) Tank (if Banie car) Assituate defense Assituate defense Assituate defense Assituate defense Tank trep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Evil E2 En E2, Ep/E2, Hade (in development of annul, out him for large annul, out him for large annul, out him find annul, out him find an annul, out him find an 25 cm British in 25 cm British              | Sow Kybuk  Rancensinder  Kypfilinder  (Ma cm Sprongipanate Llage 4.5,  Kopfulinder  Mall, 4.5 emilbers long with PDFs  shell, 4.5 emilbers long with PDFs  hurser Autochiagnideder  hurser Bodmailander  kurser Bodmailander  Kraftung-Flugzenganbwehriannoss  Kraftung  (acthward Pannerbisches 41(Kraftung)  Kassensibleder Genate file Gebierer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Ous percussion fuse; cannon shell fuse Point detonesting fuse (PDFs) under a ballistic cap, except in the case of the KZ-36, as ordinary PDFs (TM 9-1987-3, p. 543)  short base detonating fuse Short pure detonating fuse Short Date detonating fuse Short Date container with 19 parachetes and three SL2 bombs (TM 9-1987-2; p.108) Motorized AA gas  Power-dramp (Heavy h/T power-shrives rifle)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Ka (Paired)  KaZ  KaZEcha  KaZEcha  KaDOPubren)  boa  EPi KBlen  Kp  Kp  Kp  Kp  Kp  Kp  Kp  Kp  Kp  K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Enumbach Micras (Pulves)  Enick innder  Sen EZS  ErunhachiPulvurhahan ditrase aber  ant Dinivoroluvi  Jeni 104  Kinp bi made  Koppa  See pader Vanplanse, and in descriptive  Enpl   | Firecoccier (simulated fire) DEGOPH-NC propelinat containing small assesses of K sizuate (CIOS 51-62, p5) Sage-type ignive  Same as EMP niver) except that K aspect was replaced by DNT (CIOS 51-62, p5) case all Rifed Very gioral Rifed Very gioral Rifed Very gioral Top of provincitie or frame) herr Contain the containing  | Kwit   KZ KZ KZZ KZZ Kiele (in  development of same), week is  no K.S. cm SyrCu L/4.5 (Kz)  km Kz  kmissi  kzZd-  kzZd-  kzZd-  kzZd-  kzZd-  kzZd-  kzZd-  kzZd-  kzZd-  kzZd-  kzZd-  kzZd-  kzZd-  kzZd-  kzZd-   kzZd-   kzZd-   kzZd-   kzZd-   kzZd-    kzZd-    kzZd-     kzZd-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Sow Eyber,  Ranconsumber  Kepfelinder  (R.8 cm Spiengranate Linge 4.5,  Kepfelinder  (R.8 cm Spiengranate Linge 4.5,  Kepfelinder  Repfelinder  As calibers long with PDFs  humer  Astechingziloder  humer Astechingziloder  humer 22 cm Beton Kanone (Eleanbala)  Kraftzag-Flugzergabwehrkanone  Kraftzag  (achwart Panaperbichae 41(Kraftzag))  Kassoconisider Grante für Gebirger-  hannore                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Gus percussion fuse; cannon shell fuse  Point detenening fuse (PDFs) under a ballistic cap, except in the case of the KZ-36, as ordinary PDFs (TM 9-1987-3, p. 543)  short  short base detouating fuse Short Post detounting fuse Short Post detounting fuse Short Post counties with 19 parachases and three SL/2  bombs (TM 9-1987-2; p.108)  Motorized AA gas  Pawer drugs  (Sterry hA/T power-deries rifle)  Gus percussion fuse for houseful gus.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| En (Puived)  EnZ. EnZ.Sche EOD Ordren  boa EP; EPlet Epf                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Erumback Minns (Pulves)  Enick sinder  See E23  ErumbackPulvarbahe Mirans aber  and Distression  Loui ref.  Kapp jamaie  Kapp amaie  Kapp amaie  Kapp in ama | Firecoccier (simulated flar) DEGOPH-NC propellane containing small amount of K nizzae (ClOS 31-62, p5) Same as KNP alver) except that K sources was replaced by DNT (ClOS 31-62, p5) Contact Nilled Very piceal Cape of projectile or hase) part Combact battle Read, nose (of a bank) point (of a shell) Tank (if Banie car) Assituate defense Assituate defense Assituate defense Assituate defense Tank trep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Evil.  EZ. EpiZ, EpiZ, Lieb: (in development of annul, such in development of annul, such in E. E. Can Sprice L./4.5 (E.)  EM, E. E. Can Sprice L./4.5 (E.)  EM, E. E. Eville, in E. E. Eville, in 25 cm Brit (E.)  EZ. Boden (such to in AB 250 EZ Boden)  EAFlak  EMg(mach to in or BB 41(Eing.))  EZGGogh  EMGGW  EMGWC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Sow Kybuk  Rancaraminder  Kyptilinder  (R. cm Sprongspanate Linge 4.5,  Koptsinder  Some Some Some Some Some Some Some Some                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Com percussion fuse; canons shell fuse Poiss deteoseting fuse (PDFs) under a ballistic cap, except in the case of the KZ-38, as ordinary PDFs (TM 9-1995-3, p 545)  short Short percussion (isspact) fuse Short base decensaring fuse Short base decensaring fuse Short base of constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and three SL/2 Monthly of the Constalater with 19 panechases and 19 panechases an |
| En (Paired)  EnZ  EnZElche  EOD OPaired)  hos  EP; EPlet  Epf  Epf  Epf  Epf  Epf  Epf  Epf  Ep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Erumback Minns (Pulves)  Enick insider  Ene E25  ErumbackPulvarbabe Nitrate aber  att Distructions  Losi rich  King pismate  Expys  Expy moder Wamplanes, ince in descriptive  Expy  Expy fragen  Expy f | Firecoccier (simulated flar) DEGOPH-NC propellane containing small amount of K nizzae (ClOS 31-62, p5) Same as KNP alver) except that K sources was replaced by DNT (ClOS 31-62, p5) Contact Nilled Very piceal Cape of projectile or hase) part Combact battle Read, nose (of a bank) point (of a shell) Tank (if Banie car) Assituate defense Assituate defense Assituate defense Assituate defense Tank trep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Evil:  EZ. EZ. EpiZz. Each: (in development of annah, such on E.B. im SpyCe L./4.5 (E.s.) Ex. E. Ex. E. Ex. E. Ex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Sow Eyber   Ranconsumber   Ropfelinder  (G.8 cm Spiengranate Linge 4.5,  Koptsinderd which menne 88 gm HE  abell, 4.5 cmlibers long with PDFs  turns  humer Autochingziloder,  humer Autochingziloder,  humer 22 cm Beton Kanone (Elsenbala)   Kreftzug-Flugzergsabwehrkanone  Kraftzug  (achwart Pannerbisches 41(Kraftzug))  Kassosenisider Genate für Gebirger- hannone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Gus percussion fuse; cannon shell fuse  Point detenening fuse (PDFs) under a ballistic cap, except in the case of the KZ-36, as ordinary PDFs (TM 9-1987-3, p. 543)  short  short base detouating fuse Short Post detounting fuse Short Post detounting fuse Short Post counties with 19 parachases and three SL/2  bombs (TM 9-1987-2; p.108)  Motorized AA gas  Pawer drugs  (Sterry hA/T power-deries rifle)  Gus percussion fuse for houseful gus.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| En (Puirus)  EnZ  EnZElche  EnZElche  EODOPuirus)  hon  EPI EBIon  EQ  EQ  EQ  EQ  EV  EV  EV  EV  EV  EV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Enumbach Micros (Pulves)  Enick inneter  See EZS  Erumbachill virtualme ditrates aber  ant Diniversium bahase ditrates aber  ant Diniversium bahase ditrates aber  Enich bahase  Expes   | Firecoccier (simulated flar) DEGOPH-NC propellane containing small amount of K nizzae (ClOS 31-62, p5) Same as KNP alver) except that K sources was replaced by DNT (ClOS 31-62, p5) Contact Nilled Very piceal Cape of projectile or hase) part Combact battle Read, nose (of a bank) point (of a shell) Tank (if Banie car) Assituate defense Assituate defense Assituate defense Assituate defense Tank trep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Evil:  EZ. EZ. EpiZz. Each: (in development of annah, such on E.B. im SpyCe L./4.5 (E.s.) Ex. E. Ex. E. Ex. E. Ex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Sow Exploit  Rancaraunder  Kopt.linder  (R. Can Sprungshannte Linge 4.5,  Koptsinder)  Galt and Sprungshannte Linge 4.5,  Koptsinder)  Galt and Sprungshannte Linge 4.5,  Russen Aufenthaus in one with PDPs  humse Aufenthaus indies  kurner Bordenninder  Krattung-Flugnergahve khannon  Krattung-Flugnergahve khann | Gus percuasion fune; cannon shell fune Point detoneting fune (PDFs) under a ballistic cap, except in the case of the KZ-30, an ordinary PDFs (TM 9-1987-3, p. 543)  short base detonating fune Short pure detonating fune Short place detonating fune Short place detonating fune Short 200 mm Brann Rullboad Gus Markings on a container with 19 parachetes and three SL) bombs (TM 9-1987-2; p.108) Motorized AA gus Power-drauge (Genry h/T power-driven rills) Gus percussion fune for nountain gum Short barraivel morrar Short length                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| En (Paired)  KaZ  Radiche  ROD (Paired)  hon  KP; EBler  KP;  Kpi  Kpi  Kpi  Kpi  Kpi  Kpi  Kpi  Kp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Erumback Micras (Pulves)  Enick sinder  Eon EZS  ErumbackPulvarbabe blirens aber  and Discusselow!  Loui rch  Kapp piamate  Krype  Eopi Vapplanse, and in descriptive  Knapp is  Eopi Vagen  Eopi Vage | Firecocker (simulated first) DEGOPH-NC propellone containing small amount of K nizzac (ClOS 31-62, p5) Same as KNP vives) except that K souces was replaced by DNT (ClOS 31-62, p5) Contail Niled Very piceal Case of projectile or thane) part Combart bestile Reach nose (of a bumb) point (of a shell) Tank (if Beall or ci) Assistant defenses Assistant defenses Assistant defenses Tank trep Fixed amplacement under of tank gale nurset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Evil.  E.Z. EpiZ, EpiZ, Habi (in development of annul, such in the farming of annul, such in the EpiZ,             | Sow Kybek Kanonensinder Kyptilinder Kyptil | Gus percussion fuse; canons shell fuse Poist detoneting fuse (PDFs) under a ballistic cap, except is the case of the KZ-38, as ordinary PDFs (TM 9-1987-3, p 543)  short Short percussion (impact) fuse Short pass detoneting fuse Short 200 mm Bruss Railread Gus Bactings on a constainer with 19 parachetes and three SL/2 benths (TM 5-1987-2, p 100) Monorized AA gas  For except cong (feary Ar) power-driven rifle) Gus percussion juse for houseafin gus Short barruled moneral Short learned moneral Short learned moneral                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| En (Puirus)  EnZ  EnZElche  EnZElche  EODOPuirus)  hon  EPI EBIon  EQ  EQ  EQ  EQ  EV  EV  EV  EV  EV  EV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Erumback Micras (Pulves)  Enick sinder  Eon EZS  ErumbackPulvarbabe blirens aber  and Discusselow!  Loui rch  Kapp piamate  Krype  Eopi Vapplanse, and in descriptive  Knapp is  Eopi Vagen  Eopi Vage | Firecocker (simulated first) DEGOPH-NC propellone containing small amount of K nizzac (ClOS 31-62, p5) Same as KNP vives) except that K souces was replaced by DNT (ClOS 31-62, p5) Contail Niled Very piceal Case of projectile or thane) part Combart bestile Reach nose (of a bumb) point (of a shell) Tank (if Beall or ci) Assistant defenses Assistant defenses Assistant defenses Tank trep Fixed amplacement under of tank gale nurset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Evil.  EZ. E.J. Ep/Z. Habr (in development of annals, such to Evil. Im Sprice L./4.5 (E.)  Ex. E.J. Im Sprice L./4.5 (E.)  Ex. E.J. Im Sprice L./4.5 (E.)  Ex. E.J. Im Sprice L./4.5 (E.)  Ex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sow Exploit  Rancensunder  Kopt.linder  (S. Can Sprengipanate Linge 4.5,  Koptsinder  With Publicate  (S. Can Sprengipanate Linge 4.5,  Koptsinder  With Pipe  Rums  Resill, 4.9 callbore long with PDPs  Rums  Rumser Auforklangsinder  Rumser Bodensinder  Resilvang  Resilvang  Fringersynbuchranes  Kraftung  [acthorib Panaperbirchan 4](Kraftung)  Australiander  Later Connates wester  Rumser Connates wester  Rumser  | Gus percuasion fune; cannon shell fune Point detoneting fune (PDFs) under a ballistic cap, except in the case of the KZ-36, an ordinary PDFs (TM 9-1987-3, p. 543) short have detonating fune Short percuasion (lapace) have Short place detonating fune Short 200 mm Branc Rullbood Gus Markings on a container with 19 parachuses and three SL/2 bombs (TM 9-1987-2; p.108) Motorized AA gus Power-drung (Henry M/T power-driven rifle) Gus percuasion fune for nountain gus Short barght Short langth Short gus certrage Ourtigger yan patterns for AA gus (lit Crose gus mountage)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| En (Puirus)  EnZ  EnZEche  EnD(Puirus)  hon  EPI EBIon  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Enumbach Micros (Pulves)  Enick inneter  See EZS  Erumbachill virtualme ditrates aber  ant Diniversium bahase ditrates aber  ant Diniversium bahase ditrates aber  Enich bahase  Expes   | Firecoccier (simulated flar) DEGOPH-NC propellane containing small amount of K nizzae (ClOS 31-62, p5) Same as KNP alver) except that K sources was replaced by DNT (ClOS 31-62, p5) Contact Nilled Very piceal Cape of projectile or hase) part Combact battle Read, nose (of a bank) point (of a shell) Tank (if Banie car) Assituate defense Assituate defense Assituate defense Assituate defense Tank trep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Evel.  E.Z. Esp. E.Z. Esp. E. E.Z. Esp. E.Z. Esp. E.Z. Esp. E.Z. Esp. Esp. Esp. Esp. Esp. Esp. Esp. Esp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Sow Kybek Kanonensinder Kyptilinder Kyptil | Gus percussion fune; cannon shell funs  Poist detensiting fune (PDFs) under a ballistic cap, except in the case of the KZ-36, an ordinary PDFs (TM 9-1987-3, p 545)  short have deconating fune Short percussion (impact) fune Short percussion funeanting fune Short Date deconating fune Short Date deconating fune Short Date deconating fune Short Date deconating fune Short Date (PM 9-1987-1) plob) Hotolisted AA gus  Power-dramp (Genery AA)  Gus percussion june 169 nountain gus Short harvied montre Short langth Short harvied montre Short langth Short harvied montre Short langth Short paragraph platform for AA gus (lit Crose gus mounting) Short-derived gus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| En (Paired)  KaZ  KaZSche  KOD (Paired)  hos  EP) KBlet  Kp  Kp  Kp  Kp  Kp  Kp  Kp  Kp  Kp  K                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Erumback Micras (Pulves)  Enick insides  See EZS  Erumback Pulvarbabae Mirrate aber  and Distructured by  India Pulvarbabae Mirrate aber  and Distructured by  Enick Pulvarbabae  Enick  | Firecocker (simulated first) DEGOPH-NC propellone containing small amount of K nizzac (ClOS 31-62, p5) Same as KNP vives) except that K souces was replaced by DNT (ClOS 31-62, p5) Contail Niled Very piceal Case of projectile or thane) part Combart bestile Reach nose (of a bumb) point (of a shell) Tank (if Beall or ci) Assistant defenses Assistant defenses Assistant defenses Tank trep Fixed amplacement under of tank gale nurset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Evil.  EZ. E.J. Ep/Z. Habr (in development of annals, such to Evil. Im Sprice L./4.5 (E.)  Ex. E.J. Im Sprice L./4.5 (E.)  Ex. E.J. Im Sprice L./4.5 (E.)  Ex. E.J. Im Sprice L./4.5 (E.)  Ex.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sow Kybek  Kanonensinder  Kypfilinder  (ik em Syvenginante Linge 4.5,  Kypfilinder  (ik em Syvenginante Linge 4.5,  Kypfilinder  Vallen 1.5 enlibers long with PDFs  kuill, 4.3 enlibers long with PDFs  kurser Autochlagslinder  kurser Autochlagslinder  kurser Bodmalinder  kurser Bodmalinder  kurser Bodmalinder  kurser Bodmalinder  kurser Bodmalinder  kurser Bodmalinder  kurser Britagerganbwahrianose  Kraftung  (schward Pnanerbüchan 41(Kraftung))  Kanonensider Genante für Gebirger-  kanonen  kurser Länge  kurse Länger  kurser Länger  kurser Länger  kurser Länger  kurser Länger  kurser Länger                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Gus percussion fune; cannon shell funs  Poist detensiting fune (PDFs) under a ballistic cap, except in the case of the KZ-36, an ordinary PDFs (TM 9-1987-3, p 545)  short have deconating fune Short percussion (impact) fune Short percussion funeanting fune Short Date deconating fune Short Date deconating fune Short Date deconating fune Short Date deconating fune Short Date (PM 9-1987-1) plob) Hotolisted AA gus  Power-dramp (Genery AA)  Gus percussion june 169 nountain gus Short harvied montre Short langth Short harvied montre Short langth Short harvied montre Short langth Short paragraph platform for AA gus (lit Crose gus mounting) Short-derived gus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| En (Puirus)  EnZ  EnZEche  EnD(Puirus)  hon  EPI EBIon  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Erumback Micras (Pulves)  Enick sinder  Eon EZS  ErumbackPulvarbabe blirens aber  and Discusselow!  Loui rch  Kapp piamate  Krype  Eopi Vapplanse, and in descriptive  Knapp is  Eopi Vagen  Eopi Vage | Firecocker (simulated first) DEGOPH-NC propellone containing small amount of K nizzac (ClOS 31-62, p5) Same as KNP vives) except that K souces was replaced by DNT (ClOS 31-62, p5) Contail Niled Very piceal Case of projectile or thane) part Combart bestile Reach nose (of a bumb) point (of a shell) Tank (if Beall or ci) Assistant defenses Assistant defenses Assistant defenses Tank trep Fixed amplacement under of tank gale nurset                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Evil.  E.Z. E.J. EpiZ. Habr (in development of same), such to Evil. Ten Syrice L./4.5 (E.z.)  E.R. E.S. Eus Syrice L./4.5 (E.z.)  E.R. E.S. Eus Syrice L./4.5 (E.z.)  E.Z. Evelopment in Development in AB 230 E.Z. Evelopment in AB 230 E.Z. Evelopment in AB 230 E.Z. Evelopment in Evil. Evelopment in Evil. Evelopment in AB 230 E.Z. Evelopment in Evil. Evelopment in Ev             | Sow Exploit  Rancersunder  Kopt.linder  (S. 4 cm Sprovegipanate Lings 4.5,  Koptsinder  Kopt.linder  (S. 4 cm Sprovegipanate Lings 4.5,  Koptsinder  Marchalagninder  Kraftzag  Jackwert Panabertüchan 41(Kraftzag)  Marchalagninder  Marchalagninde | Gus percuasion fune; cannon shell fune Point detoneting fune (PDFs) under a ballistic cap, except in the case of the KZ-36, an ordinary PDFs (TM 9-1987-3, p. 543) short have detonating fune Short pass detonating fune Short place detonating fune Short 200 mm Branc Rullbood Gus Markings on a container with 19 parachetes and three SL/2 hombs (TM 9-1987-2; p.108) Motorized AA gus Power-drung (Henry M/T power-driven rifle) Gus percussion fune for nountain gus Short hards Short langth Short langth Short gus certrage Outligger gus platform for AA gus [lit Crose gus mounting) Short-Aurel ed gus Short Naval gus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| En (Puirus)  EnZ  EnZElche  EnD(Puirus)  hon  EP; EBles  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Enumber bilense (Pulves)  Enick inneter See EZS  ErumbackiPulvarhahae bittrate aber anti Discissedure band ber anti Discissedure band ber anti Discissedure band ber anti Discissedure ber ber antiber ber ber ber ber ber ber ber ber ber                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Firecocker (simulated first) DEGOPH-NC propelinas containing small anneans of K sizuac (CIOS 31-62, p5) Sage-type i guiter  Same as EMP-nivm) encope that K augeon was replaced by DNT (CIOS 31-62, p5) cancal Rifted Very gioral Rifted Very gioral Rifted Very gioral Rifted Very gioral Rifted very local According bactle Road was (of a bamb) point (of a shell) Tank trap Fixed complacement under of tank gate nurset  Rocating band of the bimentilic type  Rocating band of the bimentilic type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Red.  RZ.  RM. EZ. (EpiZ). Hade (in deal-gration of annals, each in the final gration of annals, each in the E.S. can Spece L./4.5 (E.s.)  km. E.S. can Spece L./4.5 (E.s.)  km. E.S. can Spece L./4.5 (E.s.)  RZ. Species (ench to in A.S. Species)  RZ. Species (ench to in A.S. Species)  RZ. Species (ench to in A.S. Species)  RZ. Exp. (ench to in A.S. Species)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Sew Kybek  Kanonensinder  Kypfalinder  (R. e. a. Syvenginnare Lings 4.5,  Kopfalinder  (R. e. a. Syvenginnare Lings 4.5,  Kopfalinder  (R. e. a. Syvenginnare Lings 4.5,  Kopfalinder  kurse Auskalagalioder,  kurse Auskalagalioder,  kurse Bodsmälinder  kurse Lingspunderbekkannone  Krintung  [ackward Pannyethichas 4](Krintung)]  kannon  hannon  hannon  hannon  hannon  hannon  kurse Lingspunder  kurse Lings | Gus percussion fune; cannon shell fune Poist detensioning fune (PDFs) under a ballistic cap, except in the case of the KZ-36, an ordinary PDFs (TM 9-1997-3, p 545)  short have deconstring fune Short percussion (laspart) have Short base deconstring fune Short Data deconstring fune Short Data deconstring fune Short Data of economical fune Short Data of a container with 19 parachases and three SL/2 heachs (TM 9-1997-7; p106) Motorized AA au Power-draup (Genry AC June Power-draup (Genry AC June Short harmled montas Short harmled montas Short harmled montas Short harmled gus Short Marval gus Short percent primacord                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| En EN (Paired)  KaZ  Radische  ROD (Paired)  han  EP; EB'ler  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Erumback Micras (Pulves)  Enick Sunder  Son EZS  Erumback Pulvarbabae Mirrate aber  and Distructions  Loni rich  Kapp in anne  Enigen  Engel   | Firecocker (simulated first) DEGOPHAT (propellinat containing small amount of K nizzate (ClOS 31-62, p5) Same as KNP alver) except that K sources was replaced by DNT (ClOS 31-62, p5) Cented Rilled Very piceal Cape of prejectile or have) part Combatt bestde Rised, note (of a benish) point (of a shell) Trank (if Banis can) Assituate defense Assituate of the combatt  | Red.  RZ.  RM. EZ. (EpiZ). Hade (in deal-gration of annals, each in the final gration of annals, each in the E.S. can Spece L./4.5 (E.s.)  km. E.S. can Spece L./4.5 (E.s.)  km. E.S. can Spece L./4.5 (E.s.)  RZ. Species (ench to in A.S. Species)  RZ. Species (ench to in A.S. Species)  RZ. Species (ench to in A.S. Species)  RZ. Exp. (ench to in A.S. Species)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Sew Kybek  Kanonensinder  Kypfalinder  (R. e. a. Syvenginnare Lings 4.5,  Kopfalinder  (R. e. a. Syvenginnare Lings 4.5,  Kopfalinder  (R. e. a. Syvenginnare Lings 4.5,  Kopfalinder  kurse Auskalagalioder,  kurse Auskalagalioder,  kurse Bodsmälinder  kurse Lingspunderbekkannone  Krintung  [ackward Pannyethichas 4](Krintung)]  kannon  hannon  hannon  hannon  hannon  hannon  kurse Lingspunder  kurse Lings | Gus percuasion fune; cannon shell fune Point detoneting fune (PDFs) under a ballistic cap, except in the case of the KZ-36, an ordinary PDFs (TM 9-1987-3, p. 543) short have detonating fune Short pass detonating fune Short place detonating fune Short 200 mm Branc Rullbood Gus Markings on a container with 19 parachetes and three SL/2 hombs (TM 9-1987-2; p.108) Motorized AA gus Power-drung (Henry M/T power-driven rifle) Gus percussion fune for nountain gus Short hards Short langth Short langth Short gus certrage Outligger gus platform for AA gus [lit Crose gus mounting) Short-Aurel ed gus Short Naval gus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| En (Puirus)  EnZ  EnZElche  EnD(Puirus)  hon  EPI EBIon  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Enumber bilense (Pulves)  Enick inneter See EZS  ErumbackiPulvarhahae bittrate aber anti Discissedure band ber anti Discissedure band ber anti Discissedure band ber anti Discissedure ber ber antiber ber ber ber ber ber ber ber ber ber                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Firecocker (simulated first) DEGOPH-NC propelinas conscious amail anneans of K mirrate (CIOS 31-62, p5) Same an EMP relyen) encope that K augeon was replaced by DNT (CIOS 31-62, p5) conscious and selection of the cons | Red.  RZ.  RM. EZ. (EpiZ). Hade (in deal-gration of annals, each in the final gration of annals, each in the E.S. can Spece L./4.5 (E.s.)  km. E.S. can Spece L./4.5 (E.s.)  km. E.S. can Spece L./4.5 (E.s.)  RZ. Species (ench to in A.S. Species)  RZ. Species (ench to in A.S. Species)  RZ. Species (ench to in A.S. Species)  RZ. Exp. (ench to in A.S. Species)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Sew Kybek  Kanonensinder  Kypfalinder  (R. e. a. Syvenginnare Lings 4.5,  Kopfalinder  (R. e. a. Syvenginnare Lings 4.5,  Kopfalinder  (R. e. a. Syvenginnare Lings 4.5,  Kopfalinder  kurse Auskalagalioder,  kurse Auskalagalioder,  kurse Bodsmälinder  kurse Lingspunderbekkannone  Krintung  [ackward Pannyethichas 4](Krintung)]  kannon  hannon  hannon  hannon  hannon  hannon  kurse Lingspunder  kurse Lings | Com percussion fase; cannon shell fam  Point detensiting fame (PDFs) under a ballistic cap, except in the case of the KZ-38, an ordinary PDFs (TM 9-199-3, p 54)  short  About percussion (impact) hase Short Dome Brace Railboad Gue Markings on a container with 19 parachetes and three SL/)  both fame (PSP-2, p 108)  Motorized AA gue  Power-drauge  (Heary A/T power-derives rills)  Short learned so just for incustain gue  Short learned sorter  Short gue carriage  Outrigare-que platform for AA gue (lit Cross gue mounting)  Short harried mortar  Short learned  Short daring and proper short of the Company  Detensiting cord; prinaccord  Splif-destroying nowe fues                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| En (Puirus)  EnZ  EnZElche  EnD(Puirus)  hon  EPI EBIon  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Erumback Minns (Pulvos)  Enick innotes See EZS  ErumbackPulvarbabae Nitrate aber and Dississession  Leni rch  Eliop pismine  E | Firecocker (simulated firs) DEGOPHAT (populane overstaining small anneams of K mirrate (CIOS 31-62, p5) Sage-type i guiver  Same as EMP raiver) encoupt that K augeon was replaced by DNT (CIOS 31-62, p5) cancel Rifted Very gional Cancel Rifted Very gional Cancel Rifted very distance Track (iif hands can) Autimate defenses Autimate defenses Autimate defenses Task trep Fixed complacement under of task gets nurset  Cryst; crosspicce (of a universal point) Cryst; crosspicce (of a universal point) Tubular propellane with a crosspicce inside of taber                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Notic  EZ Exp EZ; Ep/EZ Habt (in dealgomins of annul, such to the final parties of EX can Spece L/4.5 (Ex) has Ex can Spece L/4.5 (Ex) has Ex can Spece L/4.5 (Ex) has 25              | Sow Kybuk  Ranonensinder  Kypfilinder  (K. Cun Syvengjinane Likage 4.5,  Koptsinder dwich menne BB ym HE  shind 4.5 calibers long with PDFs  kare Aulecklagilleder,  kurzer Aulecklagilleder,  kurzer Bodennikuder  kurzer Bodennikuder  Krefung-Flugaryanhwakhanone  Kanonen-Manonen-  Kanonen-Manonen-  Kanonen-Manonen-  Kanonen-Manonen-  Kanonen-Manonen-  Krefung-Flugaryanhwakhanone  Krefung-Flugaryanhwakhanone  Kanonen-Manonen-  Kanonen-  Kanonen- | Gus percussion fuse; canons shell fuse  Poist detensing fuse (PDFs) under a ballistic cap, except is the case of the KZ-36, an ordinary PDFs (TM 9-1997-3, p 543)  short  short base deconstring fuse Short pass decensing fuse Short pass decensing fuse Short pass deconstring fuse Short pass deconstring fuse Short pass deconstring fuse Short pass deconstring fuse Short pass (TM 9-1997-17 plot) Montried An Au  Power-drauge (Heary Ar)  Short barried mortes Short barried gus Short Married gus Short Arried g |
| En EN (Paired)  KaZ  Raddiche  ROB (Paired)  hon  EP) (ED)on  EP  EP  EP  EP  EP  EP  EP  EP  EP  E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Examback Micras (Pulves)  Enick sinder  Son EZS  ErmshockPulvarbabe bitracs aber  and Disincellud  Joni 176  Kapp piamas  Koppe  English Microsoft of the Confession  English Microsoft of the Confe | Firecocker (simulated fire) DEGOPH-NC propriess conscious analy assess of K sizuate (COO 5 1-62, p5) Sape-type issuites Same as EMP sirval except that K augeon was replaced by DNT (COO 51-62, p5) Content Rifted Very gianni Con of provientie or fune) Combat bettle React, more (of a bumbly point (of a shell) Task (iff Bestle car) Assituate defense Assituate get Tend step Fixed complacement under of task gets restet Rocating hand of the himetullic type Cryse; crosspince (of a universal joint) Tubuley propellage with a crosspince inside of pabel Tubuley propellage with a crosspince inside of pabel Moroce kee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Red.  RZ.  RM. EZ. (EpiZ). Hade (in deal-gration of annals, each in the final gration of annals, each in the E.S. can Spece L./4.5 (E.s.)  km. E.S. can Spece L./4.5 (E.s.)  km. E.S. can Spece L./4.5 (E.s.)  RZ. Species (ench to in A.S. Species)  RZ. Species (ench to in A.S. Species)  RZ. Species (ench to in A.S. Species)  RZ. Exp. (ench to in A.S. Species)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Sow Experiments of the Control of th | Com percussion fase; cannon shell fam  Point detensiting fame (PDFs) under a ballistic cap, except in the case of the KZ-38, an ordinary PDFs (TM 9-199-3, p 54)  short  About percussion (impact) hase Short Dome Brace Railboad Gue Markings on a container with 19 parachetes and three SL/)  both fame (PSP-2, p 108)  Motorized AA gue  Power-drauge  (Heary A/T power-derives rills)  Short learned so just for incustain gue  Short learned sorter  Short gue carriage  Outrigare-que platform for AA gue (lit Cross gue mounting)  Short harried mortar  Short learned  Short daring and proper short of the Company  Detensiting cord; prinaccord  Splif-destroying nowe fues                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| En (Puirus)  EnZ  EnZElche  EnD(Puirus)  hoa  EPI EBles  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  Ep  E                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Erumback Minns (Pulvos)  Enick innotes Son EZS  Erumback? Pulvarbahan Nitrans aber and Dissinces loss Loss in the Enicy of the Control of the Enicy  | Firecoccier (simulated firs) DEGOPHAT (populane overstaining small anneams of K nizzae (ClOS 31-62, p5) Sage-type i guiree  Same as EMP palven) encoupt that K augeon was replaced by DNT (CROS 31-62, p5) cancel Rifted Very gional Rifted Very gional Rifted Very gional Franchisto (anneam) Darr Combant bestle Rived, was (of a humb) point (of a shell) Trail (iff Bastle can) Assimal before Assimal before Task trep Fixed complacement under of task gate nurset  Rocating hand of the himenalic type  Cryss; crosspicce (of a universal joint) Tasks trep Tasks trep Fixed complacement under of task gate nurset  Cryss; crosspicce (of a universal joint) Tasks trep Rocating hand of the himenalic type  Cryss; crosspicce (of a universal joint) Tasks trep Rocating hand of the himenalic type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Notic  EZ Exp EZ; Ep/EZ Habt (in dealgomins of annul, such to the final parties of EX can Spece L/4.5 (Ex) has Ex can Spece L/4.5 (Ex) has Ex can Spece L/4.5 (Ex) has 25              | Sow Kybuk  Ranonensinder  Kypfilinder  (K. Cun Syvengjinane Likage 4.5,  Koptsinder dwich menne BB ym HE  shind 4.5 calibers long with PDFs  kare Aulecklagilleder,  kurzer Aulecklagilleder,  kurzer Bodennikuder  kurzer Bodennikuder  Krefung-Flugaryanhwakhanone  Kanonen-Manonen-  Kanonen-Manonen-  Kanonen-Manonen-  Kanonen-Manonen-  Kanonen-Manonen-  Krefung-Flugaryanhwakhanone  Krefung-Flugaryanhwakhanone  Kanonen-Manonen-  Kanonen-  Kanonen- | Gus percussion fuse; canons shell fuse  Poist detensing fuse (PDFs) under a ballistic cap, except is the case of the KZ-36, an ordinary PDFs (TM 9-1997-3, p 543)  short  short base deconstring fuse Short pass decensing fuse Short pass decensing fuse Short pass deconstring fuse Short pass (TM 9-1997-17 plot) Montried An Au  Power-draug (Genry Ar)  Power-draug  Short barried mortes Short barried gue Short harried gue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| En EN (Paired)  EnZ  EnZéleha  EnD (Paired)  hon  EP, EDIen  EP, EDIen  Epi  Epi  Epi  Epi  Epi  Epi  Epi  Ep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Examback Micras (Pulves)  Enick sinder  Son EZS  ErmshockPulvarbabe bitracs aber  and Disincellud  Joni 176  Kapp piamas  Koppe  English Microsoft of the Confession  English Microsoft of the Confe | Firecoccier (simulated firs) DEGOPHAT (populane overstaining small anneams of K nizzae (ClOS 31-62, p5) Sage-type i guiree  Same as EMP palven) encoupt that K augeon was replaced by DNT (CROS 31-62, p5) cancel Rifted Very gional Rifted Very gional Rifted Very gional Franchisto (anneam) Darr Combant bestle Rived, was (of a humb) point (of a shell) Trail (iff Bastle can) Assimal before Assimal before Task trep Fixed complacement under of task gate nurset  Rocating hand of the himenalic type  Cryss; crosspicce (of a universal joint) Tasks trep Tasks trep Fixed complacement under of task gate nurset  Cryss; crosspicce (of a universal joint) Tasks trep Rocating hand of the himenalic type  Cryss; crosspicce (of a universal joint) Tasks trep Rocating hand of the himenalic type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Notic  EZ Exp EZ; Ep/EZ Habt (in dealgomins of annul, such to the final parties of EX can Spece L/4.5 (Ex) has Ex can Spece L/4.5 (Ex) has Ex can Spece L/4.5 (Ex) has 25              | Sow Experiments of the Control of th | Gus percussion fuse; canons shell fuse  Poist detensing fuse (PDFs) under a ballistic cap, except is the case of the KZ-36, an ordinary PDFs (TM 9-1997-3, p 543)  short  short base deconstring fuse Short pass decensing fuse Short pass decensing fuse Short pass deconstring fuse Short pass (TM 9-1997-17 plot) Montried An Au  Power-draug (Genry Ar)  Power-draug  Short barried mortes Short barried gue Short harried gue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| En EN (Paired)  EnZ  EnZéleha  EnD (Paired)  hon  EP, EDIen  EP, EDIen  Epi  Epi  Epi  Epi  Epi  Epi  Epi  Ep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Erumback Micras (Pulvot)  Enick insider  Eon EZS  ErumbackPulvarbabae Mitrato aber  and Disinventure  Enick Microsofter  Enick  | Firecocker (simulated fire) DEGOPH-NC propriess conscious analy assess of K sizuate (COO 5 1-62, p5) Sape-type issuites Same as EMP sirval except that K augeon was replaced by DNT (COO 51-62, p5) Content Rifted Very gianni Con of provientie or fune) Combat bettle React, more (of a bumbly point (of a shell) Task (iff Bestle car) Assituate defense Assituate get Tend step Fixed complacement under of task gets restet Rocating hand of the himetullic type Cryse; crosspince (of a universal joint) Tubuley propellage with a crosspince inside of pabel Tubuley propellage with a crosspince inside of pabel Moroce kee                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Notic  EZ Exp EZ; Ep/EZ Habt (in dealgomins of annul, such to the final parties of EX can Spece L/4.5 (Ex) has Ex can Spece L/4.5 (Ex) has Ex can Spece L/4.5 (Ex) has 25              | Sow Experiments of the Control of th | Gus percussion fuse; canons shell fuse  Poist detensing fuse (PDFs) under a ballistic cap, except is the case of the KZ-36, an ordinary PDFs (TM 9-1997-3, p 543)  short  short base deconstring fuse Short pass decensing fuse Short pass decensing fuse Short pass deconstring fuse Short pass (TM 9-1997-17 plot) Montried An Au  Power-draug (Genry Ar)  Power-draug  Short barried mortes Short barried gue Short harried gue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| En (Paired)  EnZ.  Enz. | Erumback Minns (Pulves)  Enick innotes  Ene EZS  Erumback? Pulvarbabae Nitrons aber  and Distronsoluel  best inch  Edge Richard  Enge Richard  | Firecoccier (simulated firs) DEGOPH-NC propellons containing small anneans of K nitrate (CIOS 31-62, p5) Sage-type i guiter  Same as ENP relyew) except that K access was replaced by DNT (CIOS 31-62, p5) castal Rifted Very gional Case of gaviestia or fane) DAT Combart bettle Rited, was (of a humb) point (of a shell) Task (if Basile can) Assimal offense Assimal point Task trap Fixed complacement under of task gub curret  Rocating hand of the himetallic type  Crues; crosspices (of a scienceal joint) Task trap Fixed complacement under of task gub curret  Rocating hand of the himetallic type  Crues; crosspices (of a scienceal joint) Tasks trap Rocating hand of the himetallic type  Crues; crosspices (of a scienceal joint) Tasks trap fixed complacement in a crosspices inside of tube More Verle More Verle More (verle More (verle More (verle More)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Notic  EZ Exp EZ; Ep/EZ Habt (in dealgomins of annul, such to the final parties of EX can Spece L/4.5 (Ex) km Ex km EX can Spece L/4.5 (Ex) km Ex km EX can Spece L/4.5 (Ex) km EX boden (such to in AB 250 EZ Boden)  EXFlat  Exp[such to in are the fill Exp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sow Experiments of the Control of th | Gus percussion fuse; canons shell fuse  Poist detensing fuse (PDFs) under a ballistic cap, except is the case of the KZ-36, an ordinary PDFs (TM 9-1997-3, p 543)  short  short base deconstring fuse Short pass decensing fuse Short pass decensing fuse Short pass deconstring fuse Short pass (TM 9-1997-17 plot) Montried An Au  Power-draug (Genry Ar)  Power-draug  Short barried mortes Short barried gue Short harried gue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| En EN (Paired)  EnZ  EnZéleha  EnD (Paired)  hon  EP, EDIen  EP, EDIen  Epi  Epi  Epi  Epi  Epi  Epi  Epi  Ep                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Erumback Micras (Pulvot)  Enick insider  Eon EZS  ErumbackPulvarbabae Mitrato aber  and Disinventure  Enick Microsofter  Enick  | Firecoccier (simulated firs) DEGOPHAT (populane overstaining small anneams of K nizzae (ClOS 31-62, p5) Sage-type i guiree  Same as EMP palven) encoupt that K augeon was replaced by DNT (CROS 31-62, p5) cancel Rifted Very gional Rifted Very gional Rifted Very gional Franchisto (anneam) Darr Combant bestle Rived, was (of a humb) point (of a shell) Trail (iff Bastle can) Assimal before Assimal before Task trep Fixed complacement under of task gate nurset  Rocating hand of the himenalic type  Cryss; crosspicce (of a universal joint) Tasks trep Tasks trep Fixed complacement under of task gate nurset  Cryss; crosspicce (of a universal joint) Tasks trep Rocating hand of the himenalic type  Cryss; crosspicce (of a universal joint) Tasks trep Rocating hand of the himenalic type                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Notic  EZ Exp EZ; Ep/EZ Habt (in dealgomins of annul, such to the final parties of EX can Spece L/4.5 (Ex) km Ex km EX can Spece L/4.5 (Ex) km Ex km EX can Spece L/4.5 (Ex) km EX boden (such to in AB 250 EZ Boden)  EXFlat  Exp[such to in are the fill Exp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sow Experiments of the Control of th | Gus percussion fuse; canons shell fuse  Poist detensing fuse (PDFs) under a ballistic cap, except is the case of the KZ-36, an ordinary PDFs (TM 9-1997-3, p 543)  short  short base deconstring fuse Short pass decensing fuse Short pass decensing fuse Short pass deconstring fuse Short pass (TM 9-1997-17 plot) Montried An Au  Power-draug (Genry Ar)  Power-draug  Short barried mortes Short barried gue Short harried gue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| En (Paired)  EnZ.  Enz. | Erumback Minns (Pulves)  Enick innotes  Ene EZS  Erumback? Pulvarbabae Nitrons aber  and Distronsoluel  best inch  Edge Richard  Enge Richard  | Firecoccier (simulated firs) DEGOPH-NC propellons containing small anneans of K nitrate (CIOS 31-62, p5) Sage-type i guiter  Same as ENP relyew) except that K access was replaced by DNT (CIOS 31-62, p5) castal Rifted Very gional Case of gaviestia or fane) DAT Combart bettle Rited, was (of a humb) point (of a shell) Task (if Basile can) Assimal offense Assimal point Task trap Fixed complacement under of task gub curret  Rocating hand of the himetallic type  Crues; crosspices (of a scienceal joint) Task trap Fixed complacement under of task gub curret  Rocating hand of the himetallic type  Crues; crosspices (of a scienceal joint) Tasks trap Rocating hand of the himetallic type  Crues; crosspices (of a scienceal joint) Tasks trap fixed complacement in a crosspices inside of tube More Verle More Verle More (verle More (verle More (verle More)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Notic  EZ Exp EZ; Ep/EZ Habt (in dealgomins of annul, such to the final parties of EX can Spece L/4.5 (Ex) km Ex km EX can Spece L/4.5 (Ex) km Ex km EX can Spece L/4.5 (Ex) km EX boden (such to in AB 250 EZ Boden)  EXFlat  Exp[such to in are the fill Exp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sow Experts  Rancarameder  Kppfalinder  (R. cm Sprovegranate Linge 4.5,  Kopfalinder  (R. cm Sprovegranate Linge 4.5,  Kopfalinder  Kopfalinder  Kopfalinder  Kopfalinder  Krotteng  Fingerspalinder  Krotteng  Kanone  Kanone  Kanone  Kanone  Krotteng  Kanone  Kanone  Kanone  Krotteng  Kanone  Kanone  Krotteng  Kanone  Kanone  Krotteng  Kanone  Kanone  Kanone  Krotteng  Kanone  | Gus percussion fuse; canons shell fuse Poist detensiting fuse (PDFs) under a ballistic cap, except in the case of the KZ-38, as ordinary PDFs (TM 9-1995-3, p 543)  short Short pare deconating fuse Short Pane (PM 5-1995-7; p 100)  banks (TM 5-1995-7; p 100)  banks (TM 5-1995-7; p 100)  banks (TM 5-1995-7; p 100)  Short terribud mortal Short larged Short pane carriage Outrigger-up platform for AA gus (lit Crose gus mounting) Short Naval gus Short Naval gus Short Naval gus Short Naval gus Nort Naval gus Short Naval gus Short Naval gus Nort Naval gus Short  |
| En (Paired)  EnZ.  Enz. | Erumback Minns (Pulves)  Enick innotes  Ene EZS  Erumback? Pulvarbabae Nitrons aber  and Distronsoluel  best inch  Edge Richard  Enge Richard  | Firecoccier (simulated firs) DEGOPH-NC propellons containing small anneans of K nitrate (CIOS 31-62, p5) Sage-type i guiter  Same as ENP relyew) except that K access was replaced by DNT (CIOS 31-62, p5) castal Rifted Very gional Case of gaviestia or fane) DAT Combart bettle Rited, was (of a humb) point (of a shell) Task (if Basile can) Assimal offense Assimal point Task trap Fixed complacement under of task gub curret  Rocating hand of the himetallic type  Crues; crosspices (of a scienceal joint) Task trap Fixed complacement under of task gub curret  Rocating hand of the himetallic type  Crues; crosspices (of a scienceal joint) Tasks trap Rocating hand of the himetallic type  Crues; crosspices (of a scienceal joint) Tasks trap fixed complacement in a crosspices inside of tube More Verle More Verle More (verle More (verle More (verle More)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Notic  EZ Exp EZ; Ep/EZ Habt (in dealgomins of annul, such to the final parties of EX can Spece L/4.5 (Ex) km Ex km EX can Spece L/4.5 (Ex) km Ex km EX can Spece L/4.5 (Ex) km EX boden (such to in AB 250 EZ Boden)  EXFlat  Exp[such to in are the fill Exp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Sow Experiments of the Control of th | Gus percussion fuse; canons shell fuse  Poist detensing fuse (PDFs) under a ballistic cap, except is the case of the KZ-36, an ordinary PDFs (TM 9-1997-3, p 543)  short  short base deconstring fuse Short pass decensing fuse Short pass decensing fuse Short pass deconstring fuse Short pass (TM 9-1997-17 plot) Montried An Au  Power-draug (Genry Ar)  Power-draug  Short barried mortes Short barried gue Short harried gue                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

Ger 324

|                             |                                         | · · · ·                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | *                                       | Gun mount; gun carriage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Li Lati Li (such as         | Lalette                                 | (Machine gun mount, pattern 1908/15)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| MG L 08/15)                 | (Manchinangewelle Lafatte: 02/15)       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| L fauch an in               | Lafetta                                 | Markings on a 170 mm morths                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 17 cm Mark.)                | (17 cm Möeper Lufette)                  | Air Farce                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| L (wech so in               | Laftwaffe                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| P##86 1 (L)}                | [Passermarinian I (Luteraffe)]          | (A/T hand greated I, introduced by Air Force)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| L/ (in designation of hus   | Lauf ( Luisbertange)                    | Leagth of a gue berrel in collibers<br>(88 mm Assault Gue pattern 43, herest 71 calibers long) .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| LS cm Srak 45 1./71)        | (8-8 cm Srumkasone 43,Lauf 71)          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| U (in designation of cheil  | Kaliberilingo (Gennato)                 | Length of a shell in calibera .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 10.5 cm Sprgs L/4.4)        | (10.5 cm Sprenggennstn,Långe 4.4)       | (\$05 mm HE Shell, 4.4, calibare long (TM 9-1983-3, p 468                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| L                           | See Leuchtg and Lg                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Li Liu                      | Lieferane                               | Delivery los; shippeon                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                             | See le: I; L                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| L3 (in beach designation    |                                         | Marking on the 250 kg Cylindrical HE South of pun-piece                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| SC 250-L2, "Hermoon")       | (Sprengcylindrinche 250-L3,             | construction; none forged steel, body tube ment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                             | "Hermann")                              | (TM 9-1985-2, pp 6-9)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Laif                        | See Li Lati Le                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Lag                         | Lager                                   | Camp, dump; depot                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1.B-61                      | Feller                                  | Designations for hydraxion hydrate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| LC                          | Lichteylindrisch Leachteylindrisch      | Cylindrical flare; coadle flare                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| LC-10                       | Lickerlindrisch 10                      | Single candle personner flare (TH 9-1985-2, p 63)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| LCM F AssiC                 | Lichterlindrisch SQ.F. Austiness C.     | Four candle parachete flare-design C (Tht 9-1985-2 p. 67)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| LC Bombe                    | lichteyladriache Bomba                  | Flate bomb                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| lit. Steam                  | infedicate                              | sirtight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Let Lete                    |                                         | PRINTERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|                             | See Li Lift Life                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| L4gW                        | See LWH -                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Likel                       | Lindskippi                              | Charging bend; a device for charging some electric bank                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Lay                         |                                         | fuses (TH 9-1985-2, p 152)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                             | See LWd; EdgW                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| les is t.                   | Irich                                   | light                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| leFls IFH                   | leichte Feldhoutiens                    | Light field howitnes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| leGi lGi LGe                | Leichtengeschüts                        | Gan for nirhorne operacione; recolliens gun                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| le GehlGi IGANG             | leichtes Gebirgeinfanterlegeschütz      | Light gas for mountain infuntry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| leGeb Jg: 1GebJG            | leichten Gebirgejägergeschüts           | Light gue for mountain rangers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| leGren IGre                 | leichter Granatwerfer                   | Light morest                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| leht; lkt                   | leichte Haubitze in-Turm                | Light turret howitzez                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| (10 cm inHT)                | (10 em lalebre Hanbiene-in-Turm)        | 100 mm Fixed borrae (breech looding)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| · lefGt UGut feJGtJJGa      | leichten Infanterio Geochica            | Light, very low velocity gun for use by infantry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| la3ge2                      | luichter Infanteriegraantwinder         | Light infantry shell fune                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| laLdgW; ILdgW               | leichter Ludungswerfer                  | Light spigot mostly                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| lektivi lativ               | leichtet Masswerfer                     | Light doctor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| LE-Man                      | Lichteinschiess Munition                | Tracer anniunition used in range adjustment fire                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| InPaid IPaids LPZid         | leictre Passenine                       | Light AP mine; A/T mine (TM 9-1985-2, p274)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| leSt IS<br>leSt spen ISLS   | leichtes Spirrgeschoes                  | Pointed, light weight bullet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| HADE ROME INC.              | insching Spiesgenchman mit Lauchenpin   | Pointed light weight bullet with traces                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Leaches (black smacilling); | Louchtgeschaas                          | Star shell; flore shell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| L; La                       |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Loucheg2; LgZde             | L nuchega ne ho nau imdes               | Time fune for use with star shelp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Leus Lt                     | Leutanes                                | Second lieutenaut (See also Oblicut)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| FAME IAMS FAM               | leichte Verfmine                        | Light mortar shell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| leWAZ                       | leichter Vucfnipenzünder                | Faxe for light moran shell                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1East                       | leichte Exermenaine                     | Light training mine                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Exhina.                     | leichte Exerziernine mit Rauchluchma    | Light training mine with smoke element                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| LF                          | Lalettenfahrzeug                        | Gue curriage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| LPA                         | See tuder Varplance, etc in descriptive |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| lfd                         | · luftdicht                             | sirtight                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Lie -                       | See L; Lig                              | The state of the s |
| trij                        | See laFH                                | The state of the s |
| IFE                         | See leFK                                | Contract of the contract of th |
| LFM                         | Son under Varplanes (de (trees Vure)    | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Lite; Lw                    | Lutwalle                                | Ast force                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Liv                         | L uftfahring age                        | Aeronautics; ariation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 10                          | -serieG                                 | long                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 16<br>LG (see 1 see         |                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Lie Cauch all               | Leichegenahien                          | Recoilless gun (lit Light gun)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 17 to 16 (6)                | 17.5 cm Leichtgeschutz (0)              | (75 mm Recordens gun, pattern 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                             | Lauchtennechen                          | MACHINE TO A TOTAL |

Flare shell; star shell

Leuchtgeschoes

labeler 18 lunge Brenoläáge See leGebiG IGeb1G See leGebIG LaF HGr(Nb) lange Foldhaubits. Lapa laGe Langgranete Innger Kanonensinder lunge Lafette . Innge Mundlochbüchsn lange Mundlochhlichse. Louchtgeochoanpulver 40 chalin) IG:W See JeGeV See InG là e## lange, schwere Feldbaubitze LUZ See under Varplagen (descripti LaZ; LaZdr, LouthaZ (such as LaZ 3/33) Lh (such as Lik SpranPost Lh 28) Leuchtgeschouszänder. Leschtspychilise (4 cm Springgrauge) Patteng Leuchtspurhilag 28) See leff! HatZ 23 Leichter Infanteriegennstnünder 23 LiGo See lelGs lige lafice le3Gn LE (ouch as hat 250 LE) LEZ See IgKZ LAST See toldg# Loichtmotal Los 1,M [black execcilling Leichmetall sech as in EZ C/27 (L10) (Xep tallade (Leichemerali) Laftaine Lichtnessi Lichenson-Stelle See lestiW. Losen Sprengs Leucheplatele LPatt ' Leuchtpatr LPibt See LP IPMI LPZMI See lePaki Les [much as in 7.5 40/1 (St Les) (D) Lorenine Schlepper [7.9 cm Pak 40/1, Selberfabelafette, Lorraine S (francoulech)). La (white steerilling) Leuchtnatumeengladung Luftachuta / See L'apur See les 'See L'apurGeoch "See leSL'apur See L'apur Mun-Louchepublisa L'opus L'apas L'a Luftechutzraum Leuchttyrn Lufttorpedo Leuchs and Siz

langer Bodenninder Long base percussion Long burning fength (func) | Long field bowitzer shell (amoke) Long shell Long gun fune " Long gun carriage ; Shell with lengthened gaine-type boost Long ghise-type booster TEGDN propellant of calorific value 650 kcml/kg used with Naval starshell charges TEGDN propellant of calorific value 570 kcal/kg and come o nitrosephthalene used with Naval statebell charge: Long and beavy field howitzer Pure for star shell Tracer container (carridge) (40 has HE Fixed Round with tracer carridge type 75) Fuxe for light infantry shall pattern 23 Marking on a container with 41 single candle parachuc flares (TM 9- 1985-2, p 108) Light metal (Aluminum) Marking on a shell funed with combined cap and paint in aluminum faluminum body PD (pro. Naval, patters 1927 (TM 9-1985-3, p 565)] Flash maning Fineh ranging station HE filling consisting of separate amplesive bedies cartos-loaded but not cemented Smooth bore pyrotechnic pistol such so Véry plat finte pistol; signal pistol Illuminating carridge Lornine tank channis [75 mm A/T Self-Propelleon Lorraine Tank Changis (French) Illuminating filler (in Air raid defease Tracer projectile trajector Projectile with tracer Tracer ammunition Air.mld ahelter Lighthouse Aerial toppedo (hea Flure piotol amme Designation of a sea

Miliana

(Heury) machine gus (Maxim) 1908 construction

Swe under Warplance (descriptive section) M Geels Moster (on morey reactor) m ger Spelde mit geringerer Swengindung With reduced bursting charge MGreeth (such Philosociasi) Minenganchosa (Minenganchoss Patrons HE, high capacity projectile (HEHC fixed sound without ohne Zerlagen) self-destruction) 2 cm Maschineagewehr in dro Flügeln 20 mm Machine gun in the wings of an airplane Marin Com cines Flugneug 2 cm Maschineseewehr FFM 20. stm Machine cun FPM MGr. Mar (such or Minemeronate (3.7 cm Mines High especity HE shell; mine shell 67 mm HEUC fixed Harrett (8) patrone 18)... round pattern 18) Mineagranewerfer Mittlebet Granewerfer Trench morter MGrT: mGrT Medium morter(B) mm) maV. mit grün Yorniganl With green signal mility mility With ballistic cap; with wandshield Mesochambengraper Million HE beary housener shell with ballimic cap (wi Mir Min MI A300 Mine A200 A/P land mine filled with 13 on picric acid See under Warpinets (deacs Militaringer Miles Min-Su Minenauche Minesweaper MANUAL MAN Mucowacie Treach stores Mipo . See MPt Mine A/P land mine containing 5% on picric, acid Mine S 150 - ois Láss miniLás miction Ladues bredius size tharge " See Malf MIW6P4 See MVPs 162 Minenzilodo Mine Tgaiter Misenzieder 530 (engiloch), 1613 MAZ 930(+), MR 9 Pressure type igniver for use in cascured British A/T mis Mark 5 (TM 9-1985-2, o 304) Mark; pattern Mark Automatic cannon Machine carbine; submachine gur Maschineskarshine a. mis Exppe With cap; capped mit Karn With core mil: Millin fune decises mit Klappensicherung (Aufschlagsunder 5075 mit With a shutter agenty device (Percussion fune 5075 with a tion each as AZ 5075 MX) shugger anfere device) Lisppensicherung Mark 50 Kankade Mk 50 Khak Designation of a castade target indicating flare (TM 9-1985- Z. pp 71-3) MKA Marina-K Saranartillaria Haval coast artillery 42234 See MX: MCb\* 1845 Designation of a two-candle sea flare (TM 9-1985-2, p 77) Municionakraftwagen Mar Assumition track . . mit Lutyocholur with passentic recuperator -MLS: MI Mandlochbilches Guine-type fuse-booster conteiner -16 -4 mit Milindumusbreiter With mustle-brake MNH See under Warplants (desc 1 mis Oberalladune With Sverhend ignition Med Modell Model: parrers Miles: M Large caliber, short barrel howitzer, mortar Möreer motoriniest. motonzed MOTO Monat-Trans Metric tobi bet month Maschinempiscofe-41 Machine pistol; automatic pistol (Called later StuC-44) 149-44 mit Peazerkoof . With amorpiercing cap Militariolizai MP: Min Military police mittlere Pansersbye Medium A/T suo mary and Ground illumination, single star, signal cartridge (loog range) Meldepatrone . MP neg mit Penaerkopi With AP head a mPz mP mit (black structilias) mir Rauchentwickler With amoke generator mit Rauchentwickles No 8 With amoke generator, type B mR8 mit Roberficklauf Vith recoil alls . See Mire Morner L (17 cm Morner L.) Markings on a 170 mm bowither MS Enlisted personnel's award Mananchaltzäbel Manning Brnas Mich Minenauchmernt Mine detector

ruch as 30 cm W& 42 5w MESO:

M-Plak wFwY

ague win for the to the

Milligrams MGCB (achweres) Maschinenes webs Konstruktion von 1908 (May im) MG08/15 (leichten) Manchinengewehr, Kon-

(Light) machine gue, 1908 construstruktion von 1906 mit Anderungen

|   |                   | , |                             | - |
|---|-------------------|---|-----------------------------|---|
|   | ldane-stab        |   | Scale; standard; reis       |   |
| • | Muster            |   | Pattern; model              |   |
|   | Magtelkausus      |   | Jacksted gus                | , |
|   | Muntion           |   | Assemblion                  |   |
| • | Manitronatrager.  | * | Assessmention carries       | 3 |
|   | Municipa efebrile |   | Ammunition factory          |   |
|   | Municionewagus    |   | Annubition wagon; caisson - |   |
|   |                   |   | a the transfer considers    |   |

Music Mustria Mun Wg Ground signal and anothe campidges Maids and Reuchpetrones M-n R-Pats With delay action (Fa) mis Vernögerung VM IV With reinforced contribugal salety belt mit verstuckt Floribeines mit vorderem Fehrungsman With forward totating band With flash reduces mis Vorlage

m warse F my ? m/verl 21 cm Morner vereinfachte Unretlafette Simplified lower carriage for 210 mm bewitner M-U (21 cm) met Vernogerung und Elappennicherung Fune venipped with delayed action and folding unferty mV+K Trench morter WY MVA See Marine Vaffenant in the varabulary Fune for medium size mostar, wach so 80 mm Minteres Warfmines Zinder

Ger 129

MYMZ1 MYNZ Morear assumition wagon; limber; cuiname Mines werfer Protze MYPE MIVEPE With whice alread mis weiseem Verniges

See Mh

See (h) norwegisch

Of new type or Salaren (See also an sed of server Art Hachfolger Successor investigation; search

Horld Nechi **Nachiorechus** National Automobile Corporation Nationals Associ MAG Sanker fort goo Nite No Neil Nabal biobal concluses Santa shell Nin M white Nebelbressaninder 11 Reaction igneter, pall type; type 36, up NNB 2-18

grenade (TM 9-1985-2, p 285) See MC NhGe NhGe Nebelements Smoke shell Smake shell with plantic has body (TM 9-1989-3, p 607) NhGr( Pr) Nabelarmore (Press-seoff) Nobelhandernsets Sanke hand arenade Nieller Smoke candle; thermal smoke gen NHE HAER Nahalkarna

Long thermal smoke generator .42 NEER L42 Nebelkerne, lasg 42 NhE as Schoellnebelkerne Rapid thermal amoke generator Propelling charge for thermal smoke go Nebalkernes Vuriladus. NhE a Wilde Nebelmunicion Smoke commission Name

NAS: NS Nebelevanal Smoke vignal Nebel swift Smoke producing meterial MARI HEAL Nabelwurfgrauste nus Stahl Stud mortae shell Rocket launcher (lit Chemical smoke project NAM Mahalmarias

(15 cm N5W41) (15 cm Nebelwerfer 41) (150 mm Rocket launchez 41) (Six tubes) (280/320 mm Rocket launcher 41) (28/32 cm Nh#41) (28/32 cm Nebelwarfer 41) (21 cm Hh# 42) (21 cm Nabelmerter 42) (210 mm Rocker launcher 42) (30 cm NbV 42) (21 cm Nebelwerfer 42) (710 mm Rocker launcher 42)

(15 cm NbW 10 line 42) (15 cm Nebelwerter-Zehaling 42) (150 mm Ten tube rocket leunches) (15 cm NbV 30 ling 43) (IS on Nebelweries Draining ling 43) (150 mm Thirty tube rocket launcher 43) DETE Mehel secasaber Smoke dimerser NC: NbC(Bombe Nebelcyladrische (Bombe) Smoke cylindrical (bomb) seuere Construktion Of new type construction (See all.) NC: 250a

Nebelevlundriache 250e

Cylindrical smoke boub filled with militure of quiber trioxide 60 and chlorosustonic acid 40% (TM 9-1985-2, p 59) Ploating cylindrical anole marker bomb (TM 9-1985-2, p 59) Nebelcylindriache 50 WC

Male

Ot Ohr Ohr

odi (obite stensilibra)

**\*** 0

-

·BD

NGemP 71

Halt Nall

NaiBP

HATPIP

HGRP

of Housesto of

NE (in designation)

Nige

ME

NaiP

See NAS MYA Mag Milman

San mader Warplance, etc in Mercantheless

(Normal yele Missoullaloostalve Mirrorelluides Genelublätzchennulus Microsofiniana Gewelmuiver

NC flake propellant for rifle ammunition Small arms NC propellant stabilized with diphenylamine Mirmodishan Madiras Madalaulvas Missaalluloon Hadelpulver NC chopped cord propellant See Nat NaP pyellulose Stibchesoulve

ohoe Pillore

sheed I main!

See Ot Ob

Ortobestérie

Oberbe fehleb

ohne Bleidenht

ober Aufschlagzlei

Colone without fixed: on

Care \$30

seven Gewelspulvar 71

Missoelvassie-Blüssebesselver

Nitroglymeria Plattero alve

Nitroglynerie Ribesopuly or

ne (Risesbule)

Mitmalysacisp sives

See Nal

See Na

Nitrogussidia

Street N Ken

See Nhk

See Nibble

NC tubular propellant NC strip peopalism (for pistole) NC peopalism, finely grammated

New rifle powder 71 (used now only in igniture)

NG-NC propellant in the form of flat droce

acardite or diphenylamine

NG-NC rebular propellant

Nitrogusaidine (NGu)

of new-type construction

PETM (pastnerythrical tetranitrate)

Propellant containing PETN

Uneful load ; pay load

Nizzocaliulose (NC)

altion in descriptive part)

Standard time

Zero point; seno PETN + 5, PETN + 10, est percent was

Low velocity ball must for close make

p 529)

NG-NC flake propellant

Double-base NG-NC propellant stabilized with centrality

Markings on a 280 mm Brune railroad gue (TM 9-1985-).

Small arms double base propellant of PSTN and NC stabilized with diphenylamine and including othyl-centralize and K sulfate

Igaiter powder consisting of black powder bound by

colleided NC (See also under Ignition in descriptive p

Single base NC propellent stabilized with diphenylamine

and with his ozniate and L sulfate added to reduce flash

Porous quick berning NC, chopped cord propellast used in drill assessition and in igniture (See also under Ig-

and including othyl controlite and E sulfate

Asserian (marking on equipment)
Without fillian (marking on some inest abelia) Virbout eluminum (in HE shell filling) Fune without neccupation clement

. Local bettery Commander in chief Without lead wire serving as dec First lieutenest

IF. SF No. No.

NC 10 WC

NC D/SEE

NdP: NP

Mark

Mate

MIK

Mun

Man

day

(m)

Nebelcylindriache D/SEE Nudelp ul ver See NS: N

Neb 200 · Neb-Ma seve Fertigues neuer Form

besides: sext to

Natroglysena

New modél

Natroglycom

of new shape

Floating cylindrical smoke marker (TM 9-1963-2% p 59) Oberlauteest Choosed cord procellant: nodular proceilest Observibleships Upper Silenia Lieuxennet colone C Observed excesses Master necessat (except Arty) Oberfeldwebe Ordnance originate artificer Branch ammonition depo-Charlesornette General Coursecrist Oberkelez szerick

| ONR                     | See Oberft                                     |                                              |
|-------------------------|------------------------------------------------|----------------------------------------------|
| ObQu; ObQultuer         | Oberquartienneimus                             | Army quartetmanter                           |
| Obst.                   | See O: Obst                                    | in a familiary                               |
| Obsert Own              | Omnibus                                        | Morne bus                                    |
|                         | Operanchemeister                               | Master netgeant (Alty)                       |
| Obwa                    |                                                |                                              |
| ObZe.                   | Obersallmeister                                | Chief paymenter                              |
| •D                      | pane Datus                                     | andsted (2                                   |
| Oed '                   | Oeslikoa                                       | Designation of summittion or weapons manufel |
|                         |                                                | Oerlikon Co.                                 |
| Out Flak                | Ostlikon Flagssugshweisksnope                  | : Oedikee Ad gun                             |
| Oits Offs               | Officier                                       | Officer                                      |
| Offa (V)                | Official day Vallegueseau Vallen-<br>of fixed) | Ordenacy officer                             |
| OFE'                    | Oberfeldkommandatur                            | High Field Command                           |
| oFink O-Fish .          | octiest Fluxubweicksgoos                       | Stationary or fixed AA gwn                   |
| eH .                    | ohan lishan                                    | Vithout a carttidae case                     |
| OXH                     | Oberkommando den Heeren                        | High Command of the Army                     |
| OXL                     | · Charkonamento der Luftwelfe                  | High Command of the Air Feeren               |
| OKM                     | Oberkommando der Kriegamerian                  | High Command of the Navy                     |
| OKW                     | Oberkommande der Vehrenscht                    | High Command of the Arned Forces             |
| el.                     | phas Ladostraifes                              | Victore corridge clip                        |
| sti (black steacilline) | ohne Mindfockbirken                            | Shell wethout gaine egetainer                |
| lobi                    | ohoe Kindangabranse                            | - Vithout massie broke                       |
| •8                      | ohne Banch                                     | Snokeless                                    |
| oil (black steacilline) | ohne Ruschonswickler                           | Shell without emoke generates                |
| OS                      | Otizierseibei                                  | Officer's award                              |
| •٧                      | elee Verzägerung                               | Victor delay (Fz)                            |
| On                      | Ones                                           | Oceans.                                      |
|                         | V====                                          | V                                            |
|                         | · • ·                                          | 4 63                                         |
|                         |                                                | <b>—</b>                                     |

See Pacq P

(lang)

| ri FV                                           | , see PM P                                                         | A .                                                                          |
|-------------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------------------|
| ₽                                               | Phosphot                                                           | See Pb                                                                       |
| •                                               | Pismie                                                             | See Pist                                                                     |
| p)                                              | polnisch 4                                                         | Polisk (narking on equipment)                                                |
| P; Pol; Polse                                   | See under Warplance (descriptive section                           | a)                                                                           |
| P; PT; Puit                                     | Pulvet                                                             | Potrelet preveillant                                                         |
| •                                               | Punkt                                                              | Point                                                                        |
| PA .                                            | Panserabwehr                                                       | Antisank defense                                                             |
| Hoter Supercoded in comp.                       | rend words by Pulag (Pannerjäger), which                           | age as tank destroyed                                                        |
| PAn PA                                          | Petrolarber                                                        | Petroleum ether                                                              |
| Pak; PAK                                        | Panaerabwehekanose                                                 | Antitagic gua                                                                |
| Notes Superseded in come                        | und words by PajagK (Panzerjägerkanone                             | ), which means tank dentmeet ann                                             |
| Pair-Fink                                       | Panzersbuche and Flugabuchchanene                                  | Assissak-antisirerak artillery                                               |
| Paus P                                          | Patrone                                                            | Carcridge: round of fixed annualtion                                         |
| Note: When the uned "Pac<br>americation (Compar | r'' is included in a designation, such as i                        | 7.5 cm SpegiPatr, it indicates a complete round of fixed                     |
| atr 318                                         | Patrone 118                                                        | AP fixed sound of some used in A/T rifle 39                                  |
| Pats B; Pets Be " .                             | Parrone, Brand                                                     | HE-inc mund of fixed name                                                    |
| PauH                                            | Patmacabulac                                                       | Carridge case (of fixed amon)                                                |
| att Kast                                        | Patmacakastes                                                      | Carridge bus againstion container                                            |
| Patr leS; Patr 15                               | Patrones leichten Spitzgeschone                                    | Light, pointed ball amountion (filled with aluminum)                         |
| ,                                               | · ····································                             | used for practice                                                            |
| Patr leS L'apus: Petr 15-                       | Patronen leichten Spitzgeschone mit                                |                                                                              |
| L'spar                                          | Leachtman                                                          | Light, pointed ball samunition with tracer; seed for                         |
| Patt Pak                                        | •                                                                  | practice .                                                                   |
| PAUS: Pauser                                    | Petronen, Phosphor, mit Stablkern                                  | Ball ammunities. Phesphores, with stiel core                                 |
| Pacis*                                          | Patroneastreilen                                                   | Cartridge clip                                                               |
| MID.                                            | Patrose 3*                                                         | Signified that cartridge was made of brees consisting of<br>Cu 72 and 2n 28% |
| Patr Smit                                       | Patrones Spitzgeschons, mit Einenkern                              |                                                                              |
| Patr SeeEfSS                                    | Patronen Spitzgenchone mie Eisenkern<br>für Scharfschutzengenignet | Pointed ball ammunicion (SAP) for 7.92 mm supper"s riffe                     |
| etr SinE (1g)                                   |                                                                    | * Long and real hell annualities with January CAR annual                     |
|                                                 |                                                                    |                                                                              |

Pauresen Spitzgeschone, mit Stabibern Pointed ball amamattion with steel core; AP about Petr Sak(10) Patrosen Spitageschoss mir Stahlkern Pointed ball amountation with hardened steel core; AP ab (gobierer) Patr Sex1'ene Patronen Spitageochonn met Scabiltorn Pointed ball ammunition with steel core and tracer; AP-T and Lauchespur Petr e5 Patrones achweres Spitzgeschoss Heavy, pointed ball amounttion (streamlined) Petr of U. Patronen, achweren Spitzgeuchoen, in Heavy, pointed ball ammunition (hard lead core), in clip" Petr 3t Patrone, Stabl Steel carridge case . . Patr St. Petrose, Stabi Steel cartridge case PareYr Carridge dram PC Beab Passenturchecklagerylindrische Boube Armer-piercing cylindrical bomb (Loading factor 15-20% HE) name as "Eass" and PC 1400 kg, known as "Fritz" (TM 9-1985-2, pp 24-75) Exemples: PC 1000 PC-R5 Semben (auch as. Rocket-assisted cylindrical amor-piercing bombs, 300 kg 500 kg and 1000 kg) Reletes start Bombes and 1000 kg (TN 9-1985-2, pp 26-31) PD Bessie (PD 100 B) Peazerdickenwand Bombe Acmorphisming thick-walled bomb (Loading factor 10% HE) (Panzetdickenward Bombe 500 kg) (500 kg AP thick-walled bomb) Per-Smit Gellakrena "Green cross" choking gas (CWS) Pfund Pomd P44 Ze (mir) Pfeedmag Horse-drawn Plus Pf Piessig Pfeasig (1/100 of mack) PG (Neck especialism) Perlitance state Shell of cast steel in the pearlite condition See Page Ph (black stendilling); P Phosphor Panzerhanbicze Phosphorus incondincy filling Amored howitzer (self-propelled mount) OPH or lePHI (leichte Panachanhitae) (Light amored howitzer) (apin) (schware Pannerbanbitze) (Medium heavy armoved howitzer)
3 kg Magnetic mine A/T hollow charge PIN 3: Palland Pensechandning the Piet: P Pistole Pint Nahan Pintoles Nalputtone Pistol cartridge, close range; low velocity pistol round Pist Halpes 08 S Pist Past 08; PPast 08 Pietolen Nahpatrone 09, Sc 9 am Law velocity pistol round,pattern 1908, with steel built Pistolesparmes 08 9 mm bell ammunition for pistol PietPatr 06 m.B. Pistolespattone 08 mit Eisenkern 9 mm pistol round with iron core ballet; SAP pistol on PletPett 08 max Piscolaspatrone 08 mit Bintereinen 9 mm pistol round with sintered iron builer PintPatr 08, St Pistolesparrose (8, Stabl 9 mes pisted round, steel case Pivt. Pivochafette Pivot mountings sorating mount (Arty) Pji Pjig Pji Pjig See Pajing and Jad Pa See Palagt PK: PKeet Parameter. PKafe See Pukativa See Pakw PL (such as is Marking on a self-propelled rocket launches [PL Werfer 42 (Selberfahrlaferre)] Place hem alver Multiperformed disc propellant Plattem dver Propellant in the form of circular discs without a central hole (used in mortars); rolled propellant; thest propellant PPer Platapamana Blank cartridge PlPauGet Plataterrenera See Vocabulary Pit Pulvides Pulvermagagie Powder magazine; ammunition massage P mK; Ph mil Phosphorgeschens mit Scahlkers AP-lac bullet with phosphores and a steel core P-Many Pl-Ma Platro etronomunici Pets Pels POL Pulver ohen Losungsmittel Solventiess propellast (propellant produced without the are of a solvent) Pomerania.

Police pistol (such as Valther)

Pressed article; molding

Limber (Arty), caiseon

Test examination; check

Phosphores projectile

Breezed stret

Criminal detectives pistol (such as Valther)

Thermosetting plastict (lit Pressed material)

(1.imber for 120 mm morter parters 42)

PIP

PPetr 98

PPK

Pn Pel

Pet Pelif

**PrGeech** 

PrGs PrG

(Pr ( 12 cm GrV 42)

Polincipintole

Prevaling

Prese-stabl

Presidentall

Pridma

See PresGr

See PietPatr 98

Phosphorgeschoes

Poliseipistole, Krimi

(Putte für il en Granerverfor 42)

Querochairtabelascon

Q: QuBel

84

12.44

24

Ke

R.P

RGe

S.G.

Prussian mile (7.532 km). scougainche Meile Phospharus ammunities Deldas Phosphornunition Projectile Projektil Propaganda shell; leaflet rockes PropGr; Propgr; PsGr "Pros Propagandagranaze Prozest Per cent (%) Presslingsumb@lane Caning or jacket made of pressed material Peti See Prf. Prill Pri Launcher for propaganda projectile Propagnadawerier Pfordentiske D.W Horsepower PSGs PaGe See Pa5Gr Peopuliest support (Propullest support DO in 210 Pulveraritza (21 cm Pulveraritza DO) PStz-(anch as PSex DO) P5# See PuSp₩ Polvertamperate Ammunition temperature See P. Pulu Pulverlaheil Pawdet factory PulvFalu Desirection of claw-horsion powder used in time-delay Fa Pulver Powder (black), steel PySt (such so in Puiver, Stabl (Konfrieder Zetleger Puiver, Stabl) (Nose fune self-destroying black powder nest, steel body) KZ ZedPySt) See Pave PWM See Pawelli Designation of a pressure type ignites used in P=-32 provised spines (TM 9-1985-2, p 294) Assistant (Military). See Feuerwerker Pyrotechalker Pyr ' Tank; armor; armored vehicle PaAbe(F) Panambieilus (Flammerverier) Armored Elementhebyen detechment Passembwahrabreilung Antique barrelion Pakhwahi Passarbiichen Passarahwehtbiiches Agittank rifle PuBella mbella Codesander's armored vehicle Pagambeichiswagen; geptasuter Befehlerengen Amnored vehicle used for artillery spetting Palleowa A/T shaped thorge missile Prinnerfaunt Hand operated greate launcher A/T, 60 (weight 93 lb) Pa# 60 Panaerlaunt 60 PaF (M) Passerianes (klein) Small hand operated greated innaches, A/T (weight 31 lb) PaPows Pennsylvakov nas Armored radio car Solid AP projectile Page PuGe APC BC HE (armorpiescing capped, ballistic cup, high Page 39 Panagerstance W explosive) shell, type 39 AP shell with a tungerer rachide core, type 40 Page 40 Page 41 Pennergenaure 41 AP shell with a sungeten carbide core for espense be gue, type 41 Proper counts Patrons Ascirack projectile in fixed ammunition [28] mm AP shell for 28/20 mm Tenened-Bore Gue chiled (7.8 cm Page Pett 41) Q.S on Passergrance Persons (1) SPBu 41) . . AP-T fixed cound containing a charge of instant Paul Pau L'most (Ra) Pagariguage Pagons Louchespus (Rainendf) Assistant abell, soft iron PaGr(V) Pannergrance (Weichelsen) Passeriaget Tank destroyer (lit Tank hunter) (See also fadPz) Pajägt Pajgt PJ; Pjäg Palack: PJK: Palk Paraeriagerkas A/T gun (lit Tank hunter's gun) Paki such as in KGr 15 Pak) Passerkopf Armor-plateing cap (Canona shell 15 with AP can) (Kanoner-Granges 14 mar Punnament) Pakpiwi Pai Pakpiwa Passedram Iwages See Vocabulary (See also Preser is (zaed betrain Pake; Pkw . Paszerkraftwages Associate motor car Pahli 45 Passernine 43 Magnetic A/T mine 43 Past Past Passer-Selberfahrlaferte Appeared self-propelled sun noun Pannerstahlersaste PaSCer PSGe PaGe Seed armor-piercing shell (with small HE content) PaSerGr. Passers Antitank-high emlogive shall PROMETROPOGRAPHICA PaSeVa: PSW: PSeV: PS Paszerspähwagen Atmoted reconnaisance car: amored score wehicle PaT Pesserture . Turret of a tank Pawe Pwg Peazerwases. Armored combar vehicle Druft Panserwaffe Armored troop at tank troop a Pawk: Pawker Panaerwarfkorpes Hollow charge A/T projectale fixed from signal plate PaVK 42 LP Passerwartkorper 42 für Lauche Hollow charge A/T projectile pattern 42 fired from 23 mm signal pistol Pavaldi: PVM Paval Hollow charge A/T greatede or mise

Cross-sectional load Quandret sentimeter Square centimeter Ouarrermancer machain . Profile: cross-section Rakees Rocket Ranchentwickler Spoke generator Barrel (G); pipe; cabe R; Ro Röbte Radio tube: nozzle R; RP Röhtrap alves Tubuine propailant Rückstonslade Recoil-operated gun fe za Round-beaded projectile Rundkon feeschoo (c); sues daniseus Russian (marking on equipment): RR Hill, ote (black Shell concaining smoke generator No 8, No 11, en Ranchestwickler Nr S. Nr I Lett cilling) Rhaimochese & R-3 Daughter of the Rhein 3 (radio-controlled AA rocket) Redie Radio (See also RF) RadfAbr; RdfAbr Radiahrabteilmas Bicycle detechment RAs (in socket launch Raketon Ag -Designation of a single-barreled Issuecher for 21 cm dealgracion 21 cm RAg M42) (21 cm Rakeren Ag M42) RLa Rockes (TM 9-1985-2, p. 259) Raup; Rp Rame Caterpillar track Respirat Rollan Remeafabracus Full-track vehicle RaupSchl: RoSchl Raujenschlepper Caterolline traceor BAZ 31 Raketenamechlaguinder 51 Rocket percussion fuse, percued directly into the nose of the warbend (TM 9-1985-2, p 235) chects reireade Batterie Moussed barrary RMP Rondblickferne Panoressic telescope B-Boot Ramboot Maser Mine aweepet R B3 (such as R 100 hS Marking on an air-to-air inconding rocket equipped with (Rakete 100 BS) "Oberin Gerilt" (TM 9-1985-2, p 255) **3374** See RZdh Rebli Rickland Recoil (of weapons) See Radf Reinader Reinsdorf Plant (See under Warplinste in descriptive section) See Radi RDet RDG (such as Reketendrahturret Rocket wire battage (86 mm rocket conta a parachate suspended 8.6 cm RDe 10009 (R.6 cm Rukemendealsgerit 1900) speed of wise with so explosive attached (TM 9-1985-2, p 240) Refe Machendral) Clockwise zilling (Wentens) Reichedruckere Government Printing Office RDZ Tandellana Hade Rinvest fuzz (Anino) (See elRDZ) Rev Revolver Remiver ROTE Revolverkano Revolver ave REW Rouchestwickles Smoke generator Rfs R-feel Referei Empty gue berrui Richttondivis Bürhlaufigs (7.5 cm Rückstondeti Lason 49) Lf (such as Recuillens (75 am Recuilless canson, par 7.5 cm RfK 43) RFK: RCK 2 lick steamfrolek same Recoilless gas (See also Dill) RFR See under Varplants (descriptive section) LEW Wilebannstenler Wooler Recoilless lanaches Ring Ring Rek See RE Ringrulver Flat ring (washer) type propellant (used in nor and memoral Rakesengranetz Rocker-anniated invinctile Raucharanate Smoke shell Raffen (nuch as Ringerlieue Ring on triped suspect DOY Refts 15) Shein Rhein (river)

| Alk (is fixed designation under a AZ 150 Rb5)  Adding a Romand S Resignation  Adding a Romand | DL DL-                             | See under Burplante in descriptive part |                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------|---------------------------------------------------------------------------|
| Nach at A. 2 100 M.5)  Kill M. Riches innen Minteretium  Rachkörper für Beshachtmagnzwerbei  Rachkörper für Beshachtmagnzwerbei  Rachkörper für Beshachtmagnzwerbei  Rachkörper für Beshachtmagnzwerbei  Rich Riches innen Minteretium  Rachkörper für Beshachtmagnzwerbei  Rachkörper für Beshachtmagnzwerbei  Rich Riches pul Rachkörper für Beshachtmagnzwerbei  Rich Riches en Angel Minteretium  Rich Riches innen Minteretium  Rachkörper für Beshachtmagnzwerbei  Rachkörier für Beshachtmagnzwerbei  Rachkörier Lachkörper für Beshachtmagnzwerbei  Rachkörier Lachkörper für Beshachtmagnzwerbei  Rachkörier Lachkörper für Beshachtmagnzwerbei  Rachkörier Lachkörper für Beshachtmagnzwerbei  Rachkörier Lachkörier für Beshachtmagnzering Lage  Rachkörier Stelle Beshachtmagnzering seine Schell Alle enteretium phontlankt für Beshachtmagnzer | RhyRhm<br>RhS (in fuze designation |                                         |                                                                           |
| Reiche innen Missereius  KER Ruschkörper R | such as AZ 150 RbS)                |                                         |                                                                           |
| Himm, Rim  Kitter, Rauckfröper in Ringstonee  Kit RgK  Kitter Rauckfröper für Schlednichten  Kitter Rauckfröper für Schlednichten  Kitter Rauchkröper für Schlednichten  Rauchkröper für Schlednichten  Rauchkröper für Schlednichten  Kitter Rauchkröper für Schlednichten  Rackers Rauchkröper für Rackers Rackers Rackers Rackers Rackers Rackers Rackers Rackers Rackers Pauserfülches Germaner Rackers Rys Schled Pauserschuck Schlednichten  Rackers Pauserfülches Graam  Rackers Rackers Rys Schled Pauserschuck Schlednichten Rackers Pauserfülches Germaner Rackers Rys Schled Pauserschuck Schlednichten Rackers Rackers Rackers Rackers Pauserfülches Germaner Rackers Rys Schled Pauserschuck Schlednichten Rackers Rac |                                    |                                         |                                                                           |
| Rauchkönger für Benbachtrungszwerten KKT Rauchkönger für Benbachtrungszwerten KKT Rauchkönger für Benbachtrungszwerten KKT Rauchkönger für Benbachtrungszwerten KKT Rauchkönger für Schiedarichten Rachtsforer Kür Benbachtrungszwerten KKT Rauchkönger für Schiedarichten Rachtsforer Kür Rauchkönger für Schiedarichten Rachtsgehis (21 cm Raugh für Schiedarichten Rachtsgehis (21 cm Rachtsgehis Schiedarichten Rachtsgehis (21 cm Rachtsgehis Schiedarichten Rachtsgehis (21 cm Rachtsgehis Schiedarichten Rachtsgehis Schiedarichten Rachtsgehis (21 cm Rachtsgehis Schiedarichten Rachtsgehis Rachtsgehis (21 cm Rachtsgehis Rachtsgehis (21 cm Rachtsgehis Rachtsgehis Rachtsgehis Rachtsgehis Rachtsgehis Rachtsgehis Rachtsgehis (21 cm Rachtsgehis Rach |                                    |                                         |                                                                           |
| EX. RES.  Rechebrare  Reschäftper für Benbachtungszwechs  Rauchkörper für Schlednichten  Rackentsprüften  Rauchkörper für Schlednichten  Rackentsprüften  Rauchkörper für Schlednichten  Rackentsprüften  Rauchkörper für Schlednichten  Rackenbard schl |                                    |                                         |                                                                           |
| Robekare Rachkörper für Benbachtungszwerte Rachkörper für Benbachtungszwerte Rachkörper für Benbachtungszwerte Rachkörper für Schiedarichten Rachkörper für Schiedarichten Rachkörper Leschigeris Lich Rad Rachkörper Leschigeris (2) can Rachera Lenchigeris (2) can Rachera Lenchigeris (3) Raketen Lenchigeris (4) Reichschiedrichtensaminererium Richmanis Richm |                                    |                                         | Built-up gun barrel; jackered gun                                         |
| KKS LL, R.Laf LR, R.Laf LL, R.Laf LL | RK                                 |                                         |                                                                           |
| Redisferes   Recitation   Rec   | REED :                             | , Rauchkörper für Beobachrungszwecke    |                                                                           |
| Redisferes   Recitation   Rec   | LEES                               | Rauchköner für Schiederichter           | See in Vocabulary                                                         |
| LLG IL.g  Zien R.L.g  (2) can Raisessa Lauchtgreit)  (2) can Raisessa Lauchtgreit)  (3) Can Raisessa Lauchtgreit)  (4) Can Raisessa Lauchtgreit)  (5) Raisessa Lauchtgreit)  Raisessa Lauchtgreit Schningsecher  Raisessa Lauchtgreit Jauchtgreit Jauchtgreit Jauchtgreit-Jaucht Saise  Raises Raup  P B Rähenspulver 18  Röhenspulver 12  Röhenspulver 12  Röhenspulver 13  Röhenspulver 13  Röhenspulver 13  Röhenspulver 13  Röhenspulver 13  Röhenspulver 14  Röhenspulver 15  Röhenspulver 15  Röhenspulver 18  Röhenspulver 18  Röhenspulver 19  P 38  Röhenspulver 19  Röhe | u.                                 |                                         | Theeled gun carriage                                                      |
| Class   Clas   | IL Rief                            | Robrentafferre                          |                                                                           |
| LLGS Raheren Lencingerini Scheingeschorn LLM Reichaufdrichrunalainestum Meine Reichaufdrichrunalainestum Reichaufdrichrunalainest | ULG: RLa                           |                                         |                                                                           |
| LLI Beichaudrichensale (Ringulaine (Ringulaine 43) Richausale (Ringulaine 43) Richausale (Ringulaine 43) Rillementation Richausale (Ringulaine 43) Rillementation Richausale (Ringulaine 43) Rillementation Richausale (Ringulaine 43) Rillementation Richausale (Ringulaine 43) Richausale (Ringulaine 44) Richausale (Ringul | 21 cm RLg)                         | (21 cm Raketen Lenchtgerät)             |                                                                           |
| Reichmank   Reignine   | LLGS'                              | Raketen Lenchtgernt Schningenchone.     | Rocket illuminant simplating device                                       |
| main in the companies of the companies o | CLM .                              | Reichalufeinheministerium               | Air Force Ministry                                                        |
| Mill (3) (Riggalinies (3) (Riggalinies (3) (Riggalinies (3) (Riggalinies (4) (Riggalinies ( | OM                                 | Reichmark                               | See in Yocabulary                                                         |
| All 43)  (Riegelmine 43)  Rillisemulation  Rillisemulation  Richling  (I om Richth)  Richtemus  Richling  (II om Richth)  Richtemus  Richling  Richtemus  Richling  Richtemus  R |                                    |                                         |                                                                           |
| id camb as in 1 cm Röchtlen 2  |                                    |                                         |                                                                           |
| ### Came how as in in the medicine of the medi |                                    |                                         |                                                                           |
| le m Efecthe)  All can Richthing alignments, Benega shelps  Richtenase  Richte |                                    |                                         |                                                                           |
| neithende mencillings   Reintername   Reinte |                                    |                                         |                                                                           |
| or (black snacelling) See Rasp P See Rasp P Röbrespulver 12 Röbrespulver 12 P Same Roberspulver 12 P Same Roberspulver 12 P Same Roberspulver 13 P Same Roberspulver 13 P Same Roberspulver 14 P Same Roberspulver 15 P Same Roberspulver 16 Roberspulver 17 Robe |                                    |                                         | (210 mm Rockling Anticoncrete Projectile)                                 |
| See Raup P Briberspulver Briberspulver P 12 Röbnespulver 12 Röbnespulver 12 Röbnespulver 12 Röbnespulver 12 Röbnespulver 13 Röbnespulver 12 P 13 Röbnespulver 14 Röbnespulver 15 Röbnespulver  |                                    |                                         |                                                                           |
| P 12 Řábrespulver 12 Gress canaca propulsků Cornas can | or (black steacilling)             |                                         | HE shell-giving red smoke burst                                           |
| P 12 Röhrenpulwer 12 Tebular IV Exposultant of calcinific values 950 ketal/Rg tead in Naval guns miner shown 1912 P 38 Röhrenpulwer 38 Tebular IV Exposultant of calcinific values 950 ketal/Rg which replaced RP 12 in Naval guns miner shown 1912 P 38 Röhrenpulwer 38 Tebular IV Exposultant of calcinific values 250 ketal/Rg which replaced RP 12 in Naval guns miner shown 1912 P 38 Röhrenpulwer 38 Tebular IV Exposultant of calcinific values 250 ketal/Rg which replaced RP 12 in Naval guns miner shows 1912 Tebular IV Exposultant of calcinific values 250 ketal/Rg which replaced RP 12 in Naval guns interest RP 12 in Naval guns  |                                    | See Raup                                |                                                                           |
| P 32 Röhempulver 32 P 38 Röhempulver 32 P 38 Röhempulver 38 Röhemp |                                    | A. C.                                   | German canaon propellade)                                                 |
| P 381  P 381  Riberapaiver 36  Riberapaiver 36  Riberapaiver 36  Riberapaiver 40  Riberapai |                                    |                                         |                                                                           |
| P 384  Riberapalver 28. Nitronaphthalia P 40  Riberapalver 40  Riberapalve |                                    | ,                                       | replaced RP 12 in Neval guan                                              |
| P 40  Ribrempulver 40. Ribrempulver 40. Nitronaphchalis meter Nose of the B* 40 peopleliant constituence of the B* 40 people of the B* 40 peop |                                    |                                         | keal/kg which replaced RP 32                                              |
| P 40 R  Röhrenpelver 40, Nitronaphchalis oters House of the RP 40 propellants constained becausemt sairs Part PC/12 Rauchpearone Rauchp |                                    |                                         |                                                                           |
| P 40 R  Röhrvapulver 40. Nitronaphchalis oren House of the RP 40 propellants constained becaming airts  Röhrvapulver Construktion 12 Röhrvapulver (2) (descriptive seems of the propellant see in RNers)  Roberspalver (Construktion 12 Raintenpanserbliches  (R. or Panaerbliches (A) Raintenpanserbliches  (R. or Roberspalver (A) Raintenpanserbliches  (R. or Roberspalver (A) Raintenpanserbliches  (R. or Roberspalver (A) Raintenpanserbliches  Roberspalver  Roberspalver  (R. or Roberspalver  Roberspalver  Roberspalver  Roberspalver  (R. or Roberspalver  R | P 40                               | Röhrespulver 40                         |                                                                           |
| orest bone of the RP 40 propellance constrained bytherein under Research Re |                                    |                                         | and 730 kcal/kg                                                           |
| Pear PC/12   Ramepareme   Souther signal careridge   PC/12   See Roberspulver Construktuon 12   Tobular propellant seed in See and 19   1912   PC/13   See Roberspulver City (descriptive section)   Raberspulver (Enderspulver)   Raberspulver (Enderspulver)   Page   Rameparement   Rameparement |                                    | Rohruspulver 40, Nitronaphthalin        | Same as above but containing denitrousphthalene                           |
| PC/12 Roberspalver Constitution 12 Tabules propellant used in Merical guin type 1912 PC/13: See Raberspalver (2) (descriptive section) PE (P) PaB 3. tem p. 18-54) Raberspalver (2) (descriptive section) Raberspalver (3.6 cm Rabers Panaertiiches Germans (6.8 cm Raberspalver Panaertiiches Germans (7.5 cm Raberspalver) Raberspalver (1.8 cm Raberspallature) Raberspalver (1.8 cm Raberspalver) Raberspalver (1.8 cm R | oces None of the RP 40 pe          |                                         |                                                                           |
| PC/31' See Richrempulver C/32 (descriptive section) PE (P) PE (P) Pall Rainerempulver (Ejabicinemplver) Pall Rainerempulver (Ejabicinemplver) Reicherempulver (Ejabicinemplver) Reicheremp |                                    |                                         |                                                                           |
| PE (P) Raberspulvet (Elabeltepulvet) PaB Raberspulvet (Elabeltepulvet) Raberspulvet (Elabeltepulvet) Raberspulvet (Elabeltepulvet) Raberspulvet (Elabeltepulvet) Raberspulvet (Raberspulvet) Raberspul |                                    | Kohrespulver Construktion 12            | Tubulat propellant used in Maval guda type 1912                           |
| PAB Rahrtenpanzerbliches (A) 18 m PAB/4 (Bit or panarrbliches (A) (Bit or panarrbliches (B) (Bit |                                    | See Robivapulver C/32 (descriptive nec  |                                                                           |
| R. B. C. P. Passervilichus 54)   Silver Passervilichus 54)   Silver Passervilichus 54)   Silver Passervilichus 54)   Silver Passervilichus 640   Silver Passervilichus 6   |                                    |                                         |                                                                           |
| PaBGe (322)  S. Eva RPaBGe (322)  S. Raterier Panaerbiches Granner  (S. See Raterier Panaerbiches Granner  S. Rater RPaBGe (322)  S. Rater RPaBGe (322)  S. Rater Repart (S. See Raterier Panaerbiches Granner  S. Rater Repart (S. See Raterier Rater |                                    |                                         |                                                                           |
| 18 rm RPnBGr 4322) (6.8 cm Raiseven Panaerffiches German 4322) (7.8 cm Raiseven Panaerffiches German 4322) (8.8 mm RF hot Crocker, fin stabilized (TM 9-1945-2, pp 24-5) mirred takeoff  SR Raiserestrantbombe Reisersff Shell containing irritant filling, each as tener gas on lactimate of the stabilized (TM 9-1945-2, pp 24-5) mirred takeoff  SR Raiserestrantbombe Reichensergening irritant filling, each as tener gas on lactimate of the stabilized (TM 9-1945-2, pp 24-5) mirred takeoff  SR Raiserestrantbombe Reichensergend tritant irritant filling, each as tener gas on lactimate of the lactimate of th |                                    |                                         |                                                                           |
| S. Ra (black steacilling)  Rakeresterst  S. Ra (black steacilling)  Rakeresterst  Rake |                                    |                                         |                                                                           |
| Security of the content of the conte |                                    |                                         |                                                                           |
| Sp. Ra. (Mack souncilling)  Reinstoff  Shell containing invitant filling, each so tene gas on lactimature  Shell-Schule  Spar  Shell-Containing invitant filling, each so tene gas on lactimature  Racker-asystemptombe  Rac | \$                                 |                                         |                                                                           |
| SB Rakerensrantbombe Rescher-seafflechombe R | S; Rs (black steacilling)          |                                         | Shell containing irritant filling, such an tent gas or                    |
| SüB-Schale Segri Haghadacchule Reiche-Segri Haghadacchule Reiche-Segri Haghadacchule Reiche Glider Construction School Reiche Construction School Re | 58                                 | Raketenerarthombe                       |                                                                           |
| Spar .  Rakecensprenggmante (2.6 cm Rayer L/4.5 and 5.7 cm Rayer 400 Vena)  (5.6 cm Rayer 400 Vena)  (5.6 cm Rayer 400 Vena)  (5.6 cm Rayer 400 Vena)  (6.6 cm Rayer 400 Vena)  (6.5 cm Rayer 400 Vena)  Rayer 400 Vena)  Rayer 400 Vena  Raye |                                    |                                         |                                                                           |
| 1.6 cm R5pgr I/4.5 und (1.6 cm R5pgr I/4.5 und (1.6 cm R5pgr I/4.5 und (1.6 cm R5pgr 400 West) (1.6 cm |                                    |                                         |                                                                           |
| (5.5) 4.5 and 5.5) 4.5 and 5.7) | .6 cm RSper L/4.5 und              |                                         |                                                                           |
| Veinnand  Veinnand  (50 mm Naval Ht rocket upto-estabelissed, Veinnaam)  (TM 9-3982-2, p 240)  Radeces Scheinschuss Gerät  Battr  (viende Braterie  dansred heteres                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | /3.5)                              | 4.5 and 5.5)                            |                                                                           |
| SMG Rakeren Scheinschuss Gerät Rocker signal simulating device Battr teitende Batterie Mannred harrery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                    | Veismenn                                | (86 mm Naval HE rocket spin-stabilized, Veiamann)<br>(TN 9-1985-2, p 240) |
| Battr, teitende Batterie Mountred hattery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                    | Raketen Scheinschuss Gerät              |                                                                           |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                    |                                         |                                                                           |

Rig Rüse Armenent; Equipment Rücklan Rickl Recoil (of a gun) tweenisch Rumanina (marking on equipment) (max) (mask (s) russisch Russian (marking on equipment) RVIV Raketen Vielfachwe Multiple rocket invocher . Raketenwerfer Rocket launcher (8.8 cm RV 43) (S.S cm Raketenwerfer 43) (88 mm wheeled socket lameher, called Puppchen) R-Vagon Rungenwagen Heavy freight car (15 tons) RYA Robewages Barrel carriage Raketengünder PZ Rocket igniter (See also ERZ) Bs Robrzerspringer Reibenzündhitchen Barrel burnter (Arty) 2745 Friction type can Robeisenziladoulve RZP Raw iron igniter powder (used in achart Live (Amee Schrapaul Shreppel heavy Heavy fuze (for use in guns with high shell acceleration) ochwe: Socionia Gun barrel length; tube length ... Saknade Second (sec) Time fuze with maximum maning time of 30 sec Sekunden 30 Time fuze with maximum running time of 45 are medified ...5/90/43 to 90 sec Time fune with no serting possible below 45 sec, and ...6/45-125 Sekundea 45-125 with max remains time of 125 eec. See Patr 50 . alcher Spanish (marking on equipment) 40) enenisch Spitzgenchien Snitengewehr Pointed ballet with a flat base 8 S-Genth Bayoner (lit Side arm) St SGt SGes 5-42 Seitengewehr 42 Bayoner, pattern 42 Stubi (Parroneubilles Stubi) Steel (such as steel cartridge) South Heavy artillery, called in the U.S. A "medium artillery" schwere Astillarie High capacity bomb (Grossladungsbombe) (Loading factor ackware Abourthouse up to 80%) Designation of a 4000 kg high capacity bomb (TM 9-1985-2, pp 43-4) Sib Subert sweed Pragmentation (A/P) bomb 58 Splitterbembe SB Thinwalled high explosive bomb; demolities bomb (Londing Spreaghoubs factor up to 75%) Soberical, hydroptatically operated, aircraft-laid, skip SB 400 (Kuzel K) Seconsbombe (Kugel B) bomb, known in the U S A as Kurt Apparatus (TM 9-1985-2, p 14) Splittet Beton (Bombe) Concrete fragmentation bomb Spreugbenadcylindrische (Bombe HE-incendiary cylindrical bomb, contg either phosphorus SBC (B): SBrC (B) or thermit (TM 9-1985-2, p 51) Concrete fragmentation bomb (Londing factor about 30% HE) SBe (B); SplBq (B) Splitterbeton (Bombe) be versions of SD Note: This book This walled HE-GP bomb; loading factor about 50%) Sprengcylindrische (Bombe) SC (B) HE cylindrical bomb, knows as "Satan" (TW'9-1985-2, p 177 (SC 1800 B) (Sprengrylindrinche 1800 kg Bombe) as also called "Misenbombs Note: This type [HE tylindrical bomb, knows as "Max" (TN 9-1985-2, p 13)] (Sprengcylindrische 2500 kg Bombe) (SC 2500 B) HE cylindrical, thick walled bomb (Semi-armor precing bomb) Sprengcylindrisch-dick wandigs Bombe SCD (B) (Sprengcylindrisch-dickwandige 1700 kg (1700 kg SAP bomb) (SCD 1700 B) Bombs) Fieldwork; entrenchement Schoone

Searchlight; highlight

Silencers mufflet

Target

Guacott

Sch

5ch

Schb

Schalle

Scheinwerfer

Schalldanofer

Scheibe

Schiensbar

Gér 336

Treach gun Rifle arenade discharger (Inuncher) Schützengrabenkanone Scientimal Schiesabecher Schiennb 66 mm Hollow charge greated launched from Schiqueb 6.6 cm Schiensbecher Hohiladons Schieseb HiGe, 6.6 cm Granate Ballistics: gunsery Schieggwases Cabiners Silvain Schlesien ` Schles Schlaggundachraube Threaded percussion prime Schlandschr, sekiZSche Tow car (motor vehicle) Schiegowagen Schl V See Schull Schall likerbog Firing Range Schieseplatz Jucerbos SchPit Lumersdorf Firms Rease Schiensplatz Kumm SchPik Schrappell Sche Mi See S-Mi Shrapael, fixed mund (65 nm Yugoslav Shrapael Fixed Schrapselipatrose [6.5 em Schrapsell ScheDatt | such saté.) em SchrPatt 223 (i) Bound 223) Rattone 223 (inspelawiech)] A/P land mine (See also Schridi) . Schuld: Schlift Schulmer Schutzenmine Black powder Schwarzpulver Schwoy HE thick-walled bomb (Loading factor 30-30%) Spreng, dickwandige Bombe SD (B) called "Splitterbombe" (fragmentation bomb). It was SAR (semi-armor-platting) Sprang, dickwandige (Hohlindung Bomber HE-HoC thick-walled bomb; SAP-HoC-A/T bomb Notes This STORE - B Small HE thick-walled inguestation bomb Spreng, dickwandige (klein) Bombe SD (k)-B Special propellent charge Sonderkamusche ... SdKars See in Vocabulary and sader Panner Souderkraftfahrau ag Saxin Demolition service motor vehicle Sprangdiener Kraftfahrsaug SdKfa (Demolition service vehicle, carrying prepared charges (Golinth Sprangdienes Emitisheneug (Golinth Schin 902) of 50/50-ROX/TNT) tremote controlled) Special projectile Sonderzeuchoan SårGe och Seaplane: hydropiese Seellnestue Seefign Pariscope (submation, tank); telescope Sabe Sehrobi Seh; S Sakunde See SELf See St. Sfl. Salbardini Subcaliber berrel for succe Selbatlade Einstecklauf SEL6 SEL Self-propelled (SP) gas (hit Self propelled go 54 5ft; Sulliatff.a Salbariabriaferre See in rocabulary Schuzzfeder Medium field howitzes schwere Feldhaubitae oF H Schoolifeverkanone Repid-fire casess SFK See S: SG: S-Gen SG Schmidding device 39 (see descriptive past) Schmidding Gerit 39 \$6 19 Special purpose device Spainteanit 5-G41 See St S-Geach SuGmark 5-Gew See St Sas S-Gew Glides SaFi Seculflinger achiverse Granerus Heavy mortas **BGr**W Heavy howitzer for fortifications (lit Heavy howitzer in OHT schwere Hasbitze in-Designation of simplenes built by Siebel Co aliGo SIGA a FG achweres laineseringenchies Heavy infantry gue Signal piscol Signalpiatole SigP Signal rocker; flare SieR Signalrakete Signalmerfet Signal flure projector SigV Siefried Kanene (Eisenbahn) Signfried milroad campon SIK (E) See siG •1G Heavy fune for light infastry shell achwerer ) agergragerainder s)mZ Schiffeksnoos Ship Cannon SK C/12 Ship cannon type 1912 Schiffskanone . Construktion 17 Ship cannon with barrel (tube) 45 calibers lone Schiffskapone Lauflinge 45 SK L/45 Schnellfeuerkanone: Schnelladeks Rapid-fire gun; tapid-loading gun SK; SLK Sockel -Pedestal: swivel Special propelling charge (S-L Ammo) S-Kee Sonderkart use he Pedestal mount Skl.; SockLai Sockellafette Amphibious plane See und Landflurzone al.de V achwerer Laduacawerfer Heavy upinot mores SLK See SK; SLE

schweres Maschineigeweb Schrepnellmine; Spreng und Schrepno also used to designate a Schützenm Spitageschoss mit Eisenkern S-16Z-95 Schiltzenminen Zünder 35 Schützenminen Zünder 44 S-147-44 Spitzgeschoes mit Stablkern SmT Gl' most Spitzeeschoss mit Stahlkern und bullet) Seal (H) Spitzgeschons mit Stahlkem (achartet) SmX1. mos Spitzgenchose mit Stahlkern und Leuchtopur schaefe Municio S-Man Spitzmunition achierer Mineamerier -16-Siidostes 50 See Ski. Socki.of wed; 5 Specificant Sondetkern Spreag Sps Spr achware Passarabwalskanou 5P (B); Sal (B) Solinter (bombe) SPBe (B); SplBe (B) Splisterbeurs (bombe) ochwere Panserbuchee 41 aPBm41 See SprBr See SprBil SoBe SpBi SP-Geech Spitzgeschoss Sputatenate Speci SpeGe: SpGe Sprenggranatenzünder mit Kluppen SpeZaK sicherung . Spitzgeschoes, Phospho-So Eper Sork: Sorke Sprengkapsel SpiBe SpiGe Splimerbombe Solistergranate See SP-Geeck Spr. Sp (such as in Spreng (28 cm Wurftorper Spream) 28 cm Wft Sor) SprB; SprBe SprBc; SprBd Sprengbombe Sprengbrand SprBig SprB Spreagbiichee (Sprengbüchse 02/24) (SprB# 02/24) Sorensladung Spryldg; Spri.dg. Sprengranare; Granare Spran Spat Ge Sprengeranate 41 Sprag-41 Spgt L (such as in Springranatuladum (15 cm Sprengransteledung) 15 cm Sprgrl) Sprengaranate mit Elmpennicherung Sprgr mK Sprenggrante Patrone Sprgt Pett Sprenggraaate Patrone fur Lampfpistole HE grenade for tifled bore aignal pistol. culiber 27 am SprgtPatr LP See Splips and Spriker SpcK Sprengkabel SorKab Sprengkorper Sorker Sork (Sprengkörper 88) (SprE 88) See So Kon Section See Spraids Sorl.da Spream atrone 24 Sp tPatt 28 Spreagachwarm ulver SpeSchwP Sprengeroff SintSt. Solie-trail carriage Spreiglafette Spralaf Powder for live and Palver for acharfe Municipa S-Pulver See in Vocabulary Schutzen antervages SPY: SPxVe Heavy A/T rifle achwere Passerbichee «Paß: SPBu

Nautical mile: knot (1855 meters: 6080 feet) Heavy machine gun Shrapnel mine; A/P mine filled with shrapnel balls; (nicknamed "nilent soldter") nauelly abbreviated as Schills (a v ) Painted bullet with two case Pressure type igniter used in A/P land mine 35 or in bounding mine (TM 9-1985-2, p 299) Push-pull type igniter used in A/P land mine 44 or in some improvised mines (TM 9-1985-2, p. 294) Pointed bullet with steel core (AP bullet) Pointed bullet with steel core and dim tracer (AP-T Pointed bullet with hardened steel core (super AP bullet) Pointed bullet with steel core and tracer (super AP-T bullet) Live emmunitue Pointed ball ammunition Heavy morrar Section 1 Special: separate Special propellent charge Explosive Honry A/T gun Fragmentation bombs antipersonnel (A/P) bomb Concrete fragmentation bomb Heavy tapered-bern gos Painted buller A aball with tenent HE shell fose with folding safety device Pointed bullet with phosphorus Demasting cap Fragmentation bombs solinter fromb Fragmention shell High explosive (280 mm HE Rocket) (High explosive bomb) HE-loc filling Demolition slab (Demolizion sisb. I ks TNT) HE charges demolition charge High emplosive shell HE shell for tapered bore gun HE filling for shell HE shell with folding safety device HE round of fixed ammaition Blasting ignition cable Blasting charge; demolition charge " Prepared demolition charge, 200 g picric acid Descrition carridge, 100 g TNT Blasting black powder Funlacive

| ,                       |                                                    | •                                                                 |
|-------------------------|----------------------------------------------------|-------------------------------------------------------------------|
| (2.2/2.0 cm 5PaBü 41)   | (2.8/2.0 cm schwere Panzerbüchse 41)               | (28/20 mm Tapered bore A/T rifle 41)                              |
| eP=Epf%s                | schwerer Papartkampiwagen                          | Heavy tank                                                        |
| aPadpWg                 | schwerer Panaeropähwagen                           | Heavy armored scouting (recommanseases) car                       |
| SR SR                   | Sehrohr                                            | Periscope; telescope                                              |
| Set                     | Schraubkappe                                       | So we want built with metal jacket streamlined (boat tails sullet |
| 45                      | achweren Spiragenchonn                             | Heavy whiten built with metal jacket; streamlined                 |
|                         | ,                                                  |                                                                   |
| 5.5                     | Zeltschrift file dan gennere Schiege-              | Journal of Propeliants and Explosives, now called                 |
|                         | und Sprengstoffwesen                               | Emlosivatofie                                                     |
| 44                      | schwerste; überschwere                             | heaviest; superheavy                                              |
| mA.                     | schwernte Artillerio                               | Heaviest Amillery (corresponds to American Heavy Amillery)        |
| aSea K                  | schweres Spitzgeuchoss mit Kern                    | Heavy pointed bullet with core                                    |
| Se ·                    | Stabl                                              | Steel                                                             |
| Se                      | Stellatift; Stellachluned                          | Fune petter; Fune adjunter wrench'                                |
| Scalo-Bissch so in      | Stachelhombe                                       | Nose spike (fuse extension md) [HE cylindrical bomb having        |
| Sc 50 Scale)            | (Sprangeylindrinche Bombe 50 Stabe)                | a one piece body with a threaded lug forged to the sense of the   |
|                         |                                                    | bomb and a spike (TM 9-1983-2, p 6)]                              |
| Stable                  | Stabiwerks                                         | Steel works                                                       |
| Seh                     | Stab                                               | Scaff                                                             |
| SHP                     | Stübeheap ul var                                   | Chopped tube propellant                                           |
| SchP                    | Stanboulver                                        | Finely granulated black powder                                    |
| Sch (B)                 | Scabbrandbombe                                     | Stick type incendiary bomb                                        |
| Sed)-II                 | Strandmine                                         | Beach mine; shore mine                                            |
| Sta (black staurilling) | Scaligues (granum)                                 | Cost strei shell                                                  |
| Stat Stage              | Stabignachoon; Stabiguougreeate                    | Light case shell of cost steel (TM 9-1985-3, p 349)               |
| Sting Stilge StiGe      | Steilhandgranate; Stielgranate                     | Stick hand greande; rodded or potato masker head greende          |
| StiGe                   | See Sthe                                           | / 4                                                               |
| SeE                     | Stabikera                                          | Steel core                                                        |
| 563                     | School                                             | Tappet; hammer (Fa)                                               |
| 9to-44                  | Stockwise                                          | A/P concrete picket type mine                                     |
| Sto-Mi                  | Spriperdrabtmine ·                                 | Trip-wire mine                                                    |
| 5P 1                    | Sternespoiver                                      | Star propellant (first 6 pointed stars)                           |
| Sup                     | Screifeap ulver                                    | Strip propellant                                                  |
| StaA                    | Stemartillerie                                     | Assault artitlery                                                 |
| StuGe StuGooth          | Stututgeochiles .                                  | Assault gus (self-propelled)                                      |
| StuG -44                | Stategeweitz -44                                   | Stormerooper's rifts (previously called MP-46)                    |
| Stelf                   | Sturmboubitze                                      | Assault howitzer (self-propelled)                                 |
| Scal                    | Stermkanone                                        | Assault Cannon (self-propelled)                                   |
| Stoka                   | Scannicaupifilugueug                               | Dive fighter-bomber                                               |
| Sa = SeSe               | Scound and Scoundinchraube                         | Tappet and tappet screw (Fx)                                      |
| \$Z .                   | Stocksunder                                        | Inserted ignites                                                  |
| Stab                    | Storebomber                                        | Dive bomber                                                       |
| SexSt                   | Scutancianube                                      | Support acrew                                                     |
| Saldinoi                | Salfittriaitrotoisoi                               | TNT parified by Na sulfire                                        |
| SVA                     | See moder Varplants, etc in descriptive            | part                                                              |
| ·5¥                     | Scheinwerfer                                       | Searchlight                                                       |
| SY                      | Survent                                            | Southwest                                                         |
|                         | schwerer Verlet                                    | Heavy smoke shell morter                                          |
| SwB [such as in         | Schwenkbahnberrung                                 | Turntable pistform                                                |
| SwB 1(5(E)]             | Schwenkhahabettuns für Kanone 5                    | Turntable platform for califord exason.51                         |
| ING .                   | (Einenblahm)]<br>schweres Vurfgernt (Verferwerint) | Heavy amoke mortar equipment                                      |
| 4Vu2                    | . schweie Antispwes                                |                                                                   |
| SZ; SZed                | Selbetzeriezer                                     | Heavy framework-type rocket launcher                              |
|                         | Secondating at                                     | Self destruction charge (Proj.)                                   |
| 1                       | T                                                  |                                                                   |
|                         |                                                    |                                                                   |
| T; Th                   | Tank                                               | Tank                                                              |
| T                       | Temperatur                                         |                                                                   |
| E To                    | Tonne                                              | Temperature                                                       |
| Ti Toep: To             | Topedo                                             | Metric ton (1000 kg = 2205 lb) Forcedo                            |
| T (macked on a fuse)    | Trolital                                           |                                                                   |
|                         |                                                    | Fuze body, such as ""VgrZ T" made of plastic material "Trolitol"  |
| (0)                     | techecho-slowskiech                                |                                                                   |
| T: To                   | Turn                                               | Czechozlovskian (marking on equipment) Turrett 'sower             |
| TAL .                   |                                                    |                                                                   |
|                         | See under Varpinnen, etc in denctiptive            | Page                                                              |

Teachlin Taschenmunition TATO Ter-Toope Metric Tons per day Totak Torpedoboots' Kar Torpedo boar's heavy gue Teilkest Partial propellent charge; increment charge T-Falle Tankfalle Tunk trap TG Turngeschitz Turret piece (gus) TH Turmheubitze Turret bowit zer ThBek (E) Theodor Bruno Kanone (Eisenbahn) Theodor Bruno railroad cana ThE Theodor cannob This Thuringen Thuripgia Tk Sec T: Tk TK. Turnkanon Turret cannon The Tanketelie Filling section; gas station Disk-type A/T mine (TM 9-1985-2, p 270) T-Mi; TM Tellermine THEZ Tellerminen Igniter for disc-type A/T mine T Non T-Mun Tank emmunities TMZ-15, 42 and 43 Types of pressure igniters for use in various T-Mines Tellerminenrinder, 35, 42 and Pils-Mines (TM 9-1985-2, pp 301-5) Te See T; To Toki Topfmine Pot-shaped land mine Teep See T; Torp TempMod Torpedomotorhoot Torpedo motor boat Transport Transport To feed or black Ammunition suitable for use in tropical climate Tis Tebldg Treibladung Propellent charge Tribi (ouch am KaTtiti 42) Treibmine (Kugeltreibmine 42) Floating (meanthered) automatic or (spherical floating mine 42) See in Vocabulary Treibspiegel 18 Treibapingelgeschos See in Vocabulary TSes (such as Meaning unknown to 21 cm TScs DO-Wa) Tu T Turret; tower Tules TMG Turmmaschinengewehr ungarisch Ustationete Hungarian (marking on equipment) Bottom gun carriage Unterrichengeschous Instruction (practice or drill) projectile U-book submerine U: U-Boot Unteraceboot Untersenbootsahweb Defense against submerines Practice projectile; shell containing black por Practice shell giving on burst a bright (lash Thungageschose Übungagenchoss mit Altu (due to the presence of Al) UbB (white exescilling) Practice shell giving on burst a cloud of smok (due to the presence of sulfer trioxide) Übungagenchous B These Under Chall (white Chill (white Chill Chil Practice shell; drill shell Dengagranete Dengamine Precision mine Domgagouchous, Rot Ubungagouchous, Schwarz Obungasprengkieper Ubungagouchous, Weiss Practice shell giving red smoke burnt Practice shell giving black amoke on beent Dummy blasting charge Practice shell giving white smoke Noncommissioned officer, corporal Revolutions per minute (ram) Ug/Mt Umds/M Umdrehungen pro Minute Überungungs Kömer Induced detonation charge Ultrashort wave (Rad) VEV. Ultrakerwelle benraguagulad Pappagation charge primer charge reworked; converted; sodified maenrheitetz www (1892 patters converted) equipped; outlisted .
[I-best causes (such as 149 mm) UtvE Clockwork mechanism (Fx)

Walfes

Vagon

Wa

WH

WK

W.

V-

Wa

WO

Officier

Guard: watch: sentine

Ordnance officer

Vagon; vehicle

Arms; wespons; dedonacé

| UZ, UWZ                       | Uhrwerkninder, Uhrzünder                 | Clackwask fuse                                                              |
|-------------------------------|------------------------------------------|-----------------------------------------------------------------------------|
| P                             |                                          |                                                                             |
|                               |                                          |                                                                             |
|                               | Versinderung                             | Change; alteration; modification                                            |
| <u>*</u>                      | verbesser                                | isseroved                                                                   |
| vz vech                       | verbotes                                 | forbidden; prohibited                                                       |
| V (such as                    | Verbondarachoes                          | Compound (jacketed) peojectile                                              |
| 5 cm PagePoor 42 V)           | O cm Pannergranate Patrone Verbend-      | (50 mm AP-Y fixed round amon, passess 42 with                               |
|                               | geochoes)                                | jacketed projectile) ,,                                                     |
|                               | reseinincht ,                            | nimplified                                                                  |
| V1 Verz                       | Vergeltung                               | Retaliation; reprinal; revenge                                              |
| V-1                           | Vergeltungswalle Eine                    | Retalisation weapon 1 (V-I) (See Descriptive part)                          |
| Y-2                           | Vergelrangswalle Zwei                    | Retaliation weapon 7 (V-2) (See descriptive part)                           |
| V-3 or HDP                    | Verpeltungawaife Deel                    | Retaliation weapon 3 (V-3)                                                  |
| V.(la fuse designation)       | Versögerung.                             | Delay                                                                       |
| (1/4)                         | (Erste Vernögerung)                      | First delay (short delay)                                                   |
| (2/10)                        | (Zweite Vernögerung)                     | [Second delay (long delay)]                                                 |
| (0.03 Sak V)                  | (0.05 Sekunden Vernögerung)              | (1/20th second dulay)                                                       |
| VA, VaA, see                  |                                          | Types of stainless steel generally conty Hi, Cr, Ma                         |
|                               | a called an an order                     | and used in German acid and explosives plants                               |
| ADM                           | See under Varplanen (dencelptive section |                                                                             |
| Verl OKH                      | Verfügung des Obeskommenden des          | Army Regulations                                                            |
|                               | Hearen                                   |                                                                             |
| Verg                          | See Y; Vezg                              |                                                                             |
| Verb                          | Verbiltais                               | Relation                                                                    |
| rect A                        | verlastete Attillacie                    | Pack artillery                                                              |
| Vergi                         | Verriegalung                             | Locking mechanism (wespons); berricade                                      |
| Vars Asset                    | Versuchannenit                           | Ministre; ded Experimental station; research laboratory                     |
| Vernine lidly                 | Versuchanastals file Handleunswallen     | Experimental station for small state                                        |
| Versite Date                  | Versuchaboot                             | Experimental host                                                           |
| Vereckyl.ef                   | Verechwindlafotse                        | Remetable gue mount                                                         |
| Person Verson                 | Verstinkt                                | reinforced                                                                  |
| VersZ                         | Verallegenmaniader                       | Delay-action feas                                                           |
| र्भ                           | Petrinlec M                              | almolified                                                                  |
| VG I                          | Volkasturmgewehr Elas                    | See in Vocabulary and under Venpous                                         |
| Vierig                        | Visiting                                 | See in Vocabulary                                                           |
| vk; Vk (block stencilling)    | veckikac                                 | shortened                                                                   |
| Vitiki                        | Veckirzzeknamerbiline                    | Shottened central tube (shospani)                                           |
| rki. sper                     | verkfickter Leuchtspur                   | Shoetened tracer trail                                                      |
| VLdg                          | Verbesourteleding                        | Adjusted charge (lis Improved charge)                                       |
| VM-stoff<br>resilt Vos V-Hall | Victor Moyer Smif                        | A compulaçed anne for Mustard gas                                           |
| Vork                          | Velocitas-Nuli<br>Verheler               | lairial velocity; mussle velocity (Proj)                                    |
| Vockart                       | Verleuring                               | Counterracoil mechanism                                                     |
| V DELCARIO                    | - Percentage and -                       | Frust increment charge in separate-loaded amountains<br>(See also Teilkart) |
| Vorl                          | Voctord                                  | Constanced                                                                  |
| Vaci                          | Vorlage                                  | Flash-reducing wed                                                          |
| Years                         | vocasie                                  | formerly                                                                    |
| Very reme                     | -                                        | Front; saterior (charge, etc)                                               |
| Vp; VpGench                   | Verpackungsgraciums                      | Dunary round for vehicle losding practice                                   |
| VILP                          | verkuraten Röhempulver                   | Tubular propullant cut into short leasths                                   |
| Vret                          | Verstecker                               | Safety pin (bomb, mine, greende); ing (fune)                                |
| VSeA .                        | Vereinigte States von Amerika            | United States of America                                                    |
| Vr.Z; VZ                      | Versuganindung                           | Salety fazing                                                               |
| VraZt; VZs                    | Veranganeit                              | Safety time (in fuzing)                                                     |
| V=                            |                                          | Model designation (Czeck fuzes)                                             |
| YZ                            | Vernögereegenänder                       | Delay-action fune                                                           |
| V2                            | Vorzagszandes                            | Safety fuse                                                                 |
| V2 80                         | Versögerangaminder 80                    | "All-ways action " fune described in TM 9-1985-R,                           |
|                               | 1                                        | p 189; weed in Y-1 bomb)                                                    |
| •                             |                                          |                                                                             |
|                               | *                                        | •                                                                           |
|                               |                                          |                                                                             |

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Warmenbertragung
                                                                       Heat transfer
                            (2 cm Sprenggranat
2 cm SprgePare L'apus
                                                                      (20 mm HE-T fixed round self-destroying by
                            Warmeübertragung)
                                                                      generated by tracer)
W: Velenic Va
                            Websmacht
                                                                       Armed Forces
                            Weicheinenke
W (white steerilling)
                                                                      Soft iros core projectile
                            -
                                                                       white
                            Wester
                                                                      Shell mortar; launcher (rocket, aigual)
                            West
                                                                       West
                            Wolfrag
                                                                    . AP subcaliber shell with mageren carbide
                            See W. We
WaA
                            Heeres-Vaffe
                                                                      Army Ordanace Office
Wabo
                            Wasserbombe
                                                                      Depth charge or bomb (lit Water homb)
WAF
                            Forechungsabteil.
                                                                      Research Section of Army Ordnance Office (See also
                            wattenante
                                                                      under Warplants,erc)
                            Wagen .
                                                                      Wagon; v chicle .
                            See under Warplants (descriptive section)
Westfällsch-Anhaltische Aktiengeseil*
                                                                      Westphalian-Anhalt Stock Company
WC (such so la
                                                                      Marking on a 50 kg cylindrical smoke bomb (TN 9-198)
NC 10 WC)
                           ' (50 kg Nebelcylindrische Be
                                                                      pp 58-9)
WEM
                            Vallepentailt ungamittel
                                                                      Liquid preparation for decontamination of weapons
                            See W; Wesf
                            Werfergranate
                                                                      Mortar shell: rocket.
Wfic; WK; VefK
                            Vurfkörper
                                                                      Special projectile for signal pistel such as Very pistel
Example: WK 361 LP (Wurftörper 361 for Leuchtpistole) HE gressde (egg shape with stem) used for 26 mm signal pieroi.
Note: Abbreviation Wft was used also to designate some tockets, each as 32 cm Wft MF150, 28 cm WftSpr and 30 cm WhSpr 42
      (TM 9-1985-2, pp 251-254)
Wer WGe
                            Vuciemante
Wat Geffer
                            Warigranate, Grinting
                                                                      Chemical rocket, such as 150 mm pattern 41, with gree
                                                                      ring
Tg: Nb
                            Wurfgranate Nebel
                                                                      Mortar amoke shell; smoke rocket, such as 150 mm
VerPets LP
                            Vurieranare Patrone für Leuchtpistole
                                                                      HE morter round for signal piecol
Examplest 2.6 cm VgrPatr 326LP (26 mm HE round with percusaion faze, for signal pistol) and 2.6 cm VgrPatr LPmZZ
          (26 see HE round with time faze, for signal pistal)
                            Wurigranate Sprenggtanate
                                                                      HE mortar shell or HE rocket
Example: 15 cm Wgr 41 Spr (150 cm HE rocket, spin stabilized and 21 cm Wgr 42 Spr (210 mm HE spin stabilized cocket)
         (TM 9-1985-2, pp 245 and 249)
                            Wurfgranatenzoode
                                                                      Morter shell fuze
                         -1985-3 (1953), p 545 the ₩gzZ is
                                                                    infantry gun or howithet
                                                                      Morter shelf fuse with body made of polystyrese plan-
WHIZT
                            Werfgranateaninder, Trolital
                                                                      material .
                            Webrnache-Heer
                                                                      Armed Forces Army (marking on vehicles)
WFO
                            See under Warplants (descriptive section)
                            Wimp el
                                                                      Pennant: streamer
Wimp
                                                                      Protectoscope (Tk); periscope
WiSp
                            Winkelspiegel
                            See Wik; WK; VefX
with (wh
                            weite Kammerhilas
                                                                      Wide central flesh tube (burster)
                                                                      Morrer amoke abell with solid filling and wid
                            waite Kammerhilles, Nebe-
WEANS
                                                                      flash tabe
                                                                      Armed Force, Air Corps marking on vehicles
                            Webenacht-Lutzwaffe
                            See Worfldg
                            See W: Welton
                                                                      Armed Forces, Navy (marking on vehicles)
                            Vehrmacht-Mazine
Verfminenzunder
WAZ
                                                                      Mortar shell fure
                                                                      Designation of airplanes built by Wiener Naustidter
                            Wiener-Neuntedt
                                                                      Flugzeugwerke, Austris
                                                                      Ordnance officer
                            Waffenoffi.nies
                            Vacipostes
                                                                       Sentry post
                                                                      Flaced propellun: (in small rectangular tableta); dice
                                                                       shaped propellant
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                  | M. I. A.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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                  | Black powder burning self-destruction element in fuze                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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| Yes (in rocket                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         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                  | Self-dearroving fune                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| #1.6 cm RSpr 400 Vom)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | (8.6 cm Raketon Spring 400, Valuenna)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | (86 mm HE rocket 400, Veismann)                                                                                                                            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swilling house,  Bennest charge (Its ignition charge); swilling house,  Bennest charge (Its ignition charge);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                 | Ze Zesche Zesche Zezin ZZen ZZ Zezin ZZ Zezin ZZ Zezin ZD Zezin ZD Zen Zn Zen Z | Zeti<br>Zeitzchrift<br>Zeitzindez<br>Zeitzindez<br>Zeitzindez<br>Sez ZDZ<br>Zeentz<br>Zeentzkartzsche<br>Zeentzkartzsche<br>Zeentziodung                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Tims, period  Periodical publication  Tims func (Tif's)  Tims active func  Addition; extension  Secondary propellous charge (in separate loaded pates)  Supplementary charge interests  Expellentageactive charge (in the content of th |
| Zuhr Zuhr<br>Zuhr All. 21.<br>Zuhr Al.<br>Zuhr All.<br>Zuhr C/96 Nep<br>Zuhr C/96 Nep<br>Zuhr Sch Nep<br>Zuhr Sch Nep<br>Zuhr Sch Nep<br>Zuhr Zuhr Zuhr Zuhr Zuhr Zuhr Zuhr Zuhr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                 | Ze Zeshe<br>Zeze Zzie; ZZ<br>Zezieha<br>Zeloz; ZDe<br>Zen; Ze; Z<br>Zenkart<br>Zenkart<br>Zenkart                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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Zeitzchelft Zeitzindet Zeitzindet Zeitzindet Zeitzindet Zeitzindet Zeitzindet Zeitzindet Zeentz Zeentz Zeentzeitzindet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Time, period  Periodical publication  Time fune (TUFA)  Time parety fune  Addition, extension  Secondary propelless charge (in separate loaded partico)  Sepplementary charge increment  Supplementary charge of HE  Merchanical and withdrawal type (une, posters 40                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| Zuhar Zuhar<br>Zuhar Zull. Zil.<br>Zulla An<br>Zulla B<br>Zulla C/98 Np<br>Zulla 26 Np                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Zinchinchen<br>Zindlachung<br>See under Besster in the descriptive pass<br>Zinchotungsbürchne<br>Zinchinten!<br>See Z. Z. d. Zdr<br>Zinchicken                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | See in Yochhalary  Reposer charge (lis igalities charge); swilliary housese  Brooser bunklag  Priming or igaliting substance  Safory fuse (its igaliting suriage)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                 | Ze Zenche Zez, ZZén, ZZ. Zezdecha ZelZe, ZDe Zeng, Zen Z Zen, Zen Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z                                                                                                                                                                                                                                                                                                | Zeif Zeinzehrift Zeitzulinder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Time, period  Periodical publication  Time fame (Tip'n)  Time safety fune  Addition; extransion  Secondary propelleus charge (in separate loaded pagina)  Secondary propelleus charge (IN)  Marchanical and withdrawal type (use, pagina)  (TM 9-199-7, pp 177-8)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Z.Bu Z.Bar<br>Z.dlg Z.dl. 21.<br>Z.dlg B<br>Z.dlg Cy<br>Z.dlg Cy96<br>Z.dlg Cy96 Np<br>Z.dlg Sy Np<br>Z.dlg Sy Np<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Zinchichen Zindlachung Zinchichen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | See in Yochhalary  Beonese charge (lit ignition charge); swilliary haustus  Beonius bushing  Priming or igniting embetance  Selvey two (lit igniting string)  Ignies to readery two                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                 | Ze Zesche Zesche Zezin ZZen ZZ Zezin ZZ Zezin ZZ Zezin ZD Zezin ZD Zen Zn Zen Z | Zeif Zeitachulft Zeitandeit Zeitandeit Zeitandeit Zeitandeit Zeitandeit Zeitandeit Zentandeit Zenta | Time, period  Periodical publication  Time func (TUFA)  Time parkty tune  Addition, extension  Secondary propelless charge (in separate loaded partico)  Sepplementary charge increment  Supplementary charge of HE  Merchanical assirtishdawal type (use, postern 40  (TM 9-1985-2, pp 177-8)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Z.Bu Z.Bar<br>Z.dlg Z.dl. 21.<br>Z.dlg B<br>Z.dlg Cy<br>Z.dlg Cy96<br>Z.dlg Cy96 Np<br>Z.dlg Sy Np<br>Z.dlg Sy Np<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Zinchichen Zinchiadung See under Bevonst in the descripcive past Zinchichengebischen Zinchichengebischen Zinchichengebischen Zinchichengebischen Zinchichengebischen Zinchichengebischen Zinchichengebischen Zinchichengebischen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | See in Vocabulary  Beneser charge (its ignition charge); swilliary become  Brooter bushing  Prinsing or igniting substance  Salvey from (it igniting scing)  ignites for safety from  Triction, pull pre ignites senters 39 need for the tradition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                 | Za Zaoche Zaza Zz Zaoche Zaza Zz Zaoche Zaza Zz Zaoche Zaug Zz Zube Zaug Zu Z Zaosiant Zaosiant Zaosiant Zaosiant Zaosiant Zaoziant Zaoziant Zaoziant Zaoziant                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Zeif Zeitachulft Zeitandeit Zeitandeit Zeitandeit Zeitandeit Zeitandeit Zeitandeit Zentandeit Zenta | Time, period Periodical publication Time fause (Tip'a) Time safety fuze Addition; extension Secondary propelless charge (in separate loaded pages) Sepplementary charge intersect Supplementary charge of HE Francis (1) pp 177-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 11 |
| Z.Bu Z.Bar<br>Z.dlg Z.dl. 21.<br>Z.dlg B<br>Z.dlg Cy<br>Z.dlg Cy96<br>Z.dlg Cy96 Np<br>Z.dlg Sy Np<br>Z.dlg Sy Np<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB<br>Z.dlegh; Z1.dgB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       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                       | Ze Zenche Zez, ZZén, ZZ. Zezdecha ZelZe, ZDe Zeng, Zen Z Zen, Zen Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z                                                                                                                                                                                                                                                                                                | Zeif Zeinzehrift Zeitzulinder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Time, period Periodical publication Time fause (Tip'a) Time safety fuze Addition; extension Secondary propelless charge (in separate loaded pages) Sepplementary charge intersect Supplementary charge of HE Francis (1) pp 177-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 117-89, 11 |
| Zahi Zahi<br>Zaligi Zali, ZL<br>Zaligi Zali, ZL<br>Zaligi Sali, Zh<br>Zaligi Ye<br>Zaligi Ye<br>Xaligi Y                                                                                                                                                 | Einsthicken Thethlackung See under Bevoner in the descriptive past Thethlackungsbirches Thethlackungsbirches Thethlackungsbirches Thethlackung Thethlackungsbirches Thethlackungsbirches Thethlackungsbirches Thethlackungsbirches Thethlackungsbirches Thethlackungsbirches Thethlackungsbirches                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | See in Vocabulary  Beneser charge (He ignition charge); swillary houston  Beneser charge (He ignition charge); swillary houston  Prinsing or igniting substances  Solvey from (He igniting secting)  (gainer for sefection postern 39 meet for the ignition  of safety fame is demulsion work and im gustag off seem in  mines and books rom. (TM 9-1987.2, a 287)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                 | Ze Parche Parch Parche Parche Parche Parche Parch  | Zeif Zeitzelwift Zeitzelwift Zeitzelwift Zeitzelwie Zeitzelwie Zeitzelwie Zestzel Zest | Time, period  Periodical publication  Time faue (TiFe)  Time party fune  Addition, extension  Secondary propelless charge (in separate loaded pathon)  Sopplementary charge increment  Supplementary charge of HE  Mechanical and withdrawell yrpe fune, pattern 40  (TM 9-198-2, pp 17-20)  Clock mechanium fune  Pull and tension wire release (gothet used with S-Mine, nome prepared charges and booly trape (TM-9-1987-2, p. 200)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Zuha Zuhar<br>Zulag Zula, ZI.<br>Zulag A.<br>Zulag C.<br>Zulag C. Yole<br>Zulag C. Yole Na<br>Zulag C. Yole Na<br>Zulag C. Zulag A.<br>Zulag C. Zulag A.<br>Zulag C. Zulag A.<br>Zulag C. Zulag A. Zulag C. Zulag Charles A. Zulag Charles A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Zindhichen Zihdladung  See under Bousset in the descriptive past Zindholmpshichen Zindholmpshichen Zindholmpshichen Zindholmpshichen Zindholmps Zindholmp Zindholmpuh                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | See in Vocabulary  Beneser charge (He ignition charge); swillary houston  Beneser charge (He ignition charge); swillary houston  Prinsing or igniting substances  Solvey from (He igniting secting)  (gainer for sefection postern 39 meet for the ignition  of safety fame is demulsion work and im gustag off seem in  mines and books rom. (TM 9-1987.2, a 287)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                 | Ze Zache Zelorie ZZ Zelorie ZZ Zelorie ZZ Zelorie ZZ Zelorie Zelozie Z | Zeif Zeitachrift Zeitanderi Zeitanderi Zeitanderi Zeitanderi Zeitanderi Zesetta Zesett | Time, period Periodical publication Time fause (Tip's) Time safety fuse Addition; extension Secondary propelless charge (in separate loaded pages) Sepplementary charge increment Supplementary charge increment Supplementary charge of HE Mechanical at 11 through type fune, pactern 40 Clock mechanism fuze Pull and treasing wire release ignites used with 5-Mine, some prepared charges and booth trape (TM'9-1985-2, p 290) Assertian names for fuse                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Zahi Zahi<br>Zaligi Zali ZL<br>Zaligi Ai<br>Zaligi Ai<br>Zaligi Ai<br>Zaligi Ai<br>Zaligi Ai<br>Zaligi Ai<br>Zaligih Zaligih<br>Zaligih Zaligih                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Zinchiachen Zinchiachen Zinchiachen Zinchiachen Zinchichen gebirchen Zinchichen gebirchen Zinchichen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | See in Vocabulary  Beonier bushing  Priming or Ignition charge); swilliary haustice  Beonier bushing  Priming or Ignition enhousece  Solvey have (list Ignition series)  Solvey have (list Ignition series)  Solvey have (list Ignition)  Priction, pull type Igniter) partern 39 used for the Ignition  Priction, pull type Igniter) partern 39 used for the Ignition  of endery have in demullian work and for number off come in  Theories personnel and booky race. (TM 9-1985-2, p. 285)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    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177-8)  Clock mechanism fune  Pull and tension wire release ignited used with 5-Mine, none prepared charges and booly trape (TM-9-198-2, p 200)  Austrian name for fune  Orlanance department administration                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Zuha Zuhar<br>Zulag Zula, ZL<br>Zulag A<br>Zulag Cyon<br>Zulag Cyon<br>Zulag Cyon Na<br>Zulag Cyon Na<br>Zulag Cyon Na<br>Zulag Cyon Na<br>Zulag Na                                                                                  | Einsthicken  The discharge between in the descriptive past  The discharge beinhar  The discharge being                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | See in Vocabulary  Beneau charge (He ignition charge); swilliery houston  Beneau charge (He ignition charge); swilliery houston  Prinsing or ignition webeneau  Solvey foor (He ignition votag) (gainer the selection)  Friction, pall type ignition postero 39 need for the ignition of safety fame is demulsion vote and im making off seems in  places and body type; (TM 9-1987-2, p. 285)  Threading perturnion primer  Threading perturnion primer  Threading for percursion primer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                 | Za Zache Zache ZZ Zache ZZ Zache ZZ Zache ZZ Zache Zz Zache Z Zache Z Zonikat Zoni Zac Zache Z Zonikat Zoni Zac Zache Z Zozikat Zacz 40 Zu Zacz 25 Zac | Zelf Zelfachwift Zelfander Zelfander Zelfander Zelfander Zestligender  | Time, period Periodical publication Time fause (Tip'n) Time safety fuze Addition; extreasion Secondary propelless charge (in separate loaded pages) Sepolementary charge increment Supplementary charge increment Supplementary charge of HE Mechanical and sain rindument type fuze, pactern 40 Clock mechanism fuze Pull and treasion wire release ignites used with S-Mine, some prepared charges and booby trape (TM'9-1985-2, p 290) Assection anneas for fuze Ordanace department administration See in Vocabulary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Zuha Zuhar<br>Zulag Zula ZL<br>Zulag A<br>Zulag Cyba<br>Zulag Cyba<br>Zulag Cyba bap<br>Zulag Cyba bap<br>Zulag Cyba bap<br>Zulag Zulag Zulag Zulag<br>Zulag Zulag Zu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Einsthichen Tändlachung See under Bousser is the descriptive past Tändlachungshärhne Tändnisch See 27 224 Zde Tändachung Tändnisch Tändachungshänder Tändach | See in Vocabulary  Beonies bushing  Priming or ignition enhance  Selvery has originated and a selection of the lighting string  planter for andersy from  Principal representation of the lighting string  planter for andersy from  Principal representation of the lighting  planter for andersy from  Principal representation of the lighting  planter and booly resp. (TM 9-1985-2, p. 285)  Threaded permission primer  Threaded bashing for porcussion primer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                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Pull and tension wire release ignitet used with 5-Mine, nome  prepared charges and booby trape (TM-9-1985-2, p 200)  Austrian name for fuse  Ordanace department a deministration  See in Vocabulary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Zuha Zuha<br>Zulig Zuli ZL<br>Zulig A<br>Zulig Vya<br>Zulig Vya<br>Zulig Cyya<br>Zulig Cyya<br>Zulig Diya<br>Zulig Diya<br>Zul                                                                                                                                                                                                 | Einst his chen  Zindlachung  Ser under Bevonne in the descriptive pent  Zindlachung shirther  Zindlachung shirther  Zindlachung shirther  Zindlachung shirther  Zindlachung shirther  Zindlachung shirther  Zindlachung  Zindlachung  Zindlachung                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | See in Vocabulary  Beneau charge (He ignition charge); swillary houston  Beneau charge (He ignition charge); swillary houston  Princing or igniting substance  Satery face (He igniting suring)  Ignitude for satery face  Princing, pull type Igniting suring)  Ignitude for satery face  Princing, pull type Igniting suring  Internation princip  See 20 (2) (2) (2) (2) (2) (2) (2) (2) (2) (2)                                                                                                                                                                                                                                                    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Austrian name for fuse  Ordanace department a deministration  See in Vocabulary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Zuha Zuha<br>Zulig Zuli ZL<br>Zulig A<br>Zulig Vya<br>Zulig Vya<br>Zulig Cyya<br>Zulig Cyya<br>Zulig Diya<br>Zulig Diya<br>Zul                                                                                                                                                                                                 | Einsthichen Einstliebung Einstliebung Einstliebung bie hen Einstliebung bie hen Einstliebung bie hen Einstliebung Einstlie | See in Vocabulary  Benear charge (its ignition charge); swilliary housese  Brooter bushing  Priming or Igniting substance  Solvy face (its Igniting substance)  Faction, pull type Ignitise pattern 39 need for the Ignition of salety face is demallation work and far sunsing off same in managed prime in the control of salety face (its Ignition in the control of salety face)  Throutfold housing for procression primer  Rady (T.) cyamed by face differences  Rady (T.) cyamed by face differences                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 | Ze Zache Zezen ZZ Zezen ZZ Zezen ZZ Zezen ZZ Zezen ZZ Zezen Z Zezen Zu Zen Zu Zen Zu Zezen Z Zezen Zu Zezen Zez | Zelf Zelfachwift Zelfandes Zelfandes Zelfandes Zespilleglechur See ZDZ Zesett Z | Time, period Periodical publication Time fause (TiFa) Time safety fuze Addition; extransion Secondary propelless charge (in separate loaded pages) Sepolementary charge increment Supplementary charge increment Supplementary charge of HE Mechanical assistantishdaweal type (nase, pactern 40 (TM 9-1975-2, pp 17-8) Citical merchanical with releases ignited mand with S-Mine, some prepared charges and booby trape (TM 9-1985-2, p 200) Assexion ansex for fuse Ordanace department administration See In Vocabulary See Zwillingsgestell in Vocabulary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Zuhu Zuhe<br>Zuhug Zuhi ZL<br>Zuhug A<br>Zuhug Ng<br>Zuhug Cyye<br>Zuhug Cyye<br>Zuhug Ng<br>Zuhug N                                                                                                                                                                                                                                                                                                                                                         | Einsteinen  Einsteinen  Ere mehr Bounner is des descriptive past  Zinsteinen   | See in Vocabulary  Benear charge (its ignition charge); swilliary housese  Brooter bushing  Priming or Igniting substance  Solvy face (its Igniting substance)  Faction, pull type Ignitise pattern 39 need for the Ignition of salety face is demallation work and far sunsing off same in managed prime in the control of salety face (its Ignition in the control of salety face)  Throutfold housing for procression primer  Rady (T.) cyamed by face differences  Rady (T.) cyamed by face differences                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                 | Ze Parche Zez Zezhe ZZ Zezhe ZZ Zezhe ZZ Zezhe ZZ Zezhezh Zen Zez Zen Zez Zen Zez Zen Zez                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Zeif Zeitzekulft Zeitzekulft Zeitzekulft Zeitzekulft Zeitzekulft Zeitzekulft Zeitzekulft Zestzekulft Zestzekulft Zestzekulft Zesstzekulft Zesstzekul | Time, period Periodical publication Time faue (Tigra) Time safety fuse Addition; extension Secondary propelleus charge (in separata loaded pagina) Secondary charge of His Merchanical and withdrawal type fuse, pagina 40 (TM 9-199-2, pp 177-8) Clock mechanism fuze Pull and treasion wire release ignicet used wick 5-Mine, some prepared charges and booby trape (TM'S-1985-2, p 290) Austrian names for fuse Ordance department administration Sec In Vocabulary  Sec In Vocabulary  Sec In Vocabulary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Zahi Zahi<br>Zalig Zali ZL<br>Zalig Ai<br>Zalig Ai<br>Zalig Cybe<br>Zalig Cybe<br>Zalig Cybe hip<br>Zalig Cybe hip<br>Zalig Dyb hip<br>Zalig Dib hi                                                                                                                                                                                                                                                                                                                                 | Einsthicken  Sier inder Besons in the descriptive past  Lindschaugsbircher  Lindschaugsbircher  Lindschaugsbircher  Lindschaugsbircher  Lindschaugsbircher  Lindschaugsbircher  Lindschaugsbircher  Lindschaube  Lind | See in Vocabulary  Beneser charge (He ignition charge); swillary housese  Beneser charge (He ignition charge); swillary housese  Princing or igniting substance  Satery face (Iz igniting string)  Igniture for satery face  Princine, pull type Igniture purtuen 39 moed for the Ignition  Friecton, pull type Igniture purtuen 39 moed for the Ignition  of satery face in dermillines work and for sealing off sees in  state of the interest in the interest in the interest in  The model healthing for purcunities primes  Dispersion counced by fune differences  Raley (FA)  Pull and preseaves type Igniture, pattern 39, for use in A/T  and A/P land since (TIA 9-1957-2, p. 322)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                 | Ze Zeache Zez Zeache Zez Zezen Zez Zezen Zez Zezen Zez Zezen Zen Zen Zen Zen Zen Zen Zen Zen Zen Z                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Zeif Zeitackeift Zeitandes Zeitandes Zeitandes See ZDZ Zeents Zee | Time, period Periodical publication Time faue (Tip'a) Time safety fuse Addition; extension Secondary propellous charge (in separate loaded partico) Secondary propellous charge (in separate loaded partico) Sepolementary charge increment Supplementary charge of HE Michanical assirt include using the control of the City |
| Zuhi Zuhi<br>Zulig Zuli, ZL<br>Zulig Ai<br>Zulig Di<br>Zulig Cybe<br>Zulig Cybe<br>Zulig Cybe Bip<br>Zulig Di Bip<br>Zulig Di Bip<br>Zulig Di Zulig Di<br>Zulig Di Zulig Di Zulig Di<br>Zulig Di Zulig Di Zulig Di<br>Zulig Di Zulig                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Einsthicken Ziedlachung Ser under Bevonnt in the descriptive past Ziedlachung blichen Ziensteinen Sen 21 24 Zeh Ziensteinen Ziendachung Zi | See in Vocabulary  Beneser charge (He ignition charge); swillary housese  Brooter bushing  Priming or igniting substance  Solvey from (He ignition suched)  Ignites the antery from  Princion, pull Type Ignites' posters 39 need for the Ignition  of sadory frame is demulsion work and for suning off some in  place and body tran; CTM 9-1987-Z, p 285)  Throutfol health gree personner Throutest personner  Dispersion caused by frame differences  Latery (72) and mines (TM 9-1985-Z, p 392)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 | Ze Parche Zez Zezhe ZZ Zezhe ZZ Zezhe ZZ Zezhe ZZ Zezhezh Zen Zez Zen Zez Zen Zez Zen Zez                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Zeif Zeitzekulft Z | Time, period Periodical publication Time func (Tip'n) Time safety func Addition; 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| Zehi Zahi<br>Zelig Zeli, ZL<br>Zelig A,<br>Zelig B,<br>Zelig D,<br>Zelig D,<br>Zelig D,<br>Zelig D, Selig<br>Zelig D, Selig<br>Zelig D, Zelig<br>Zelig D,<br>Zelig D, Zelig<br>Zelig D,<br>Zelig D, Zelig<br>Zelig D, Zelig D, Zelig<br>Zelig D, Zelig D,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Einsthichen Einstliebung Einer under Besonnt in the descripcive past  Zindelagenis  Ser 21 24 24  Zindelagenis Ser 21 24 24  Zindelagenis Ser 21 24 24  Zindelagenis                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | See in Vocabulary  Beneser charge (He ignition charge); swillary houstee  Brootes bushing  Priming or igniting substances  Subvey from (He ignition seeing)  ignites the matery from  Priction, pull type ignites' postern 39 used for the ignition of antery from is demultion work and for smaller off memory from the demultion work and for smaller off seeing true. (TM 9-1987-7, p 287)  Throutfol housing for percursion primer  Dispursion caused by from differences  Raby (Fa)  Pull and preserves type ignites, partern 29, for use in A/T and other prices (TM 9-1987-7, p 372)  150 ms Ton-barreled seate incitor immediace  Collisions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 | Ze Zeache Ze Zeache Ze Zeache Ze Zezhou ze Zezhou ze Zezhou ze Zezhou ze Zezhou ze Zeache Zea | Zelf Zelizachulft Zeltzindes Zeltzindes Zeltzindes Zestriplinjechuw See ZDZ Zesett Zesetta Zestriplinjechum Zesetta Zestriplinjechum Zesetta Zestripling Zestripli | Time, period Periodical publication Time faue (Tip'n) Time safety fuse Addition; extension Secondary propellous charge (in separate loaded partico) Sepolementary charge increment Supplementary charge increment Supplementary charge of HE Mechanical assirthindrawal type (use, pastern 40 (TM 9-195-2, pp 17-8). Clock mechanism fuse Pull and tension wise release ignites used with S-Minn, some prepared charges and booly traps (TM's-1985-2, p 250) Assertian mane for fuse Orninance department administration See las Vocabulary See las Vocabulary Twin gua wiveit (pedestal) pattern 42 Hall-funct whicle Cylinder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Zuha Zuha<br>Zulig Zuli, ZL<br>Zulig A<br>Zulig CAII, ZL<br>Zulig A<br>Zulig Cy98<br>Zulig Cy98<br>Zulig Cy98 bly<br>Zulig Dig Zuligh; ZLuigh<br>Zuligh; ZLuigh<br>Zuligh; ZLuigh<br>Zuligh; Zuligh; Zuligh<br>Zuligh; Zuligh;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Enthischen Zindlachung Zindlachung Zindlachung abeit has descriptive past Zindlachung abeit has Zindlachung Zindla | See in Vocabulary  Benner charge (He ignition charge); swillary houstne  Benner charge (He ignition charge); swillary houstne  Priming or igniting substance  Solvey fune (He igniting swing)  Igniture for natery fune  Pitecton, pull type Ignitury postern 39 meed for the ignition  of natery fune is desumilation work and for naming off same les  ributes and booby rang. (TM 9-1957-2, p. 285)  Through percuision primer  Through percuision primer  Through percuision primer  Through and primer information of the control of the contr |                                 | Ze Zenche Zez Zenche Zez Zezlen ZZ Zezlen Ze Zezlen Ze Zezlen Zenche Zen | Zeif Zeitackwift Zeitaikwift Zeitaikwift Zeitaikwift Zeitaikwift Zeitaikwift Zeitaikwift Zeenta Zeen | Time, period Periodical publication Time fame (TUFa) Time safety fuse Addition; extension Secondary propelless charge (in separate loaded patho) Mechanical anti-vithdrawal type fuse, pactern 40 (TM-9-198-7, pp 177-8) Glock mechanism fuse Pull and transion wire release ignites used with 5-Mine, some prepared charges and booby trape (TM-9-198-7, p 200) Assertian names for fuse Ordanace department administration See in Vecabulary See in Vecabulary See in Vecabulary Hailtransk vahicle Cylinder Propellate in cylindrical grains                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Zahi Zahi Zahi Zahi Zalig Zali, ZL Zalig A Zali, ZL Zalig A Zali, ZN Zalig Cybe Zalig Cybe Zalig Cybe Zalig Cybe Zalig Cybe Zalig Cybe Zalig Dip Zalig B Zalig Cybe Zalig B Zalig Cybe Zalig B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Einsthicken Third Laden  See under Besonst in the descriptive past  Tindheims whiches  Ti | See in Vocabulary  Beneau Charge (He ignition charge); swillary houster  Brooter bucking  Prinsing or ignition substances  Subvey fonce (its ignition series)  ignites the métry fame  Priction, pull type ignites postern 39 need for the ignition in  of safety fame is demalision work and for number off sources  Thereafted percursion primer  Thereafted percursion primer  Thereafted percursion primer  Dispersion caused by fame differences  Raley (Fa)  Pull and presessor type ignites, pattern 29, for use in A/Y  metabor  (A) and aliane (TM 9-1995-L, p 372)  Tenetibus  Bourstad (Proj)  Bourstad (Proj)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                 | Ze Zache Ze Zene Ze Zezen Ze Zene Ze Zene Ze Zene Ze Zene Ze Zene Ze Zezen Ze Zene Ze Zezen Ze Zezen Ze Zezen Ze Zezen Z | Zeif Zeitackulft Zeitandes | Time, period Periodical publication Time faue (Tip'n) Time safety fuse Addition; extension Secondary propellous charge (in separate loaded partico) Sepolementary charge increment Supplementary charge increment Supplementary charge of HE Mechanical assirthindrawal type (use, pastern 40 (TM 9-195-2, pp 17-8). Clock mechanism fuse Pull and tension wise release ignites used with S-Minn, some prepared charges and booly traps (TM's-1985-2, p 250) Assertian mane for fuse Orninance department administration See las Vocabulary See las Vocabulary Twin gua wiveit (pedestal) pattern 42 Hall-funct whicle Cylinder                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| Zehr Zehr Zehr Zehr Zehr Zehr Zehr Zehr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Einsthicken Third Laden  See under Besonst in the descriptive past  Tindheims whiches  Ti | See in Vocabulary  Benner charge (He ignition charge); swillary houstne  Benner charge (He ignition charge); swillary houstne  Priming or igniting substance  Solvey fune (He igniting swing)  Igniture for natery fune  Pitecton, pull type Ignitury postern 39 meed for the ignition  of natery fune is desumilation work and for naming off same les  ributes and booby rang. 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